

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 1166. (Vol. XXIII. No. 18.)

MAY 1, 1931

Weekly, Price 6d.
Post free, 7½d. Abroad, 8d.

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C.2.

Telephone: (2 lines), Holborn 3211 and 1884.

Telegrams: Truditur, Westcent, London.

Annual Subscription Rates, Post Free.

United Kingdom .. 33s. 0d. United States .. \$8.75.
Other Countries .. 35s. 0d.*

* Foreign subscriptions must be remitted in British currency (See last Editorial Page.)

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EDITORIAL COMMENT



The Land of the Five Seas

IN Tudor times, when men used to talk about the Great Cham of Tartary and Prester John, the merchant adventurers were strongly attracted to sail Eastward Ho! by their firm belief in the riches of "the Indies." Since we have taken over the administration of India, we have come to realise that Asiatic countries are not as a rule rich in the sense in which Great Britain and France are rich. Asiatic countries are mainly agricultural, and to develop their agricultural wealth to the full needs very careful administration by rulers trained in Western methods of government, backed by the skill and enterprise of European scientists and engineers. We do not treat the agriculturist as a cow to be milked dry for the benefit of his rulers. We do all that is possible to increase his prosperity. We found the Punjab largely an arid desert. Our irrigation engineers have converted it into a vast granary. These methods were not followed by the Asiatic Emperors who preceded us in ruling India, and they are not now followed by those who are attempting to rule China. Whence then, it may be asked, arose the fable of the wealth of the Indies and Cathay?

The answer to the question may be found by studying the transport methods of past days. The producing countries along the southern coast of Asia are cut off from the countries of Europe by a series of desert stretches. These could only be crossed, slowly and painfully, by caravans, the main vehicle of commerce (if the word "vehicle" may be so used) being the camel. It was not a commercial proposition to transport grain or timber on camel-back. The articles of commerce chosen for export to the West had to be small in bulk but valuable in proportion to their bulk. Consequently it was jewels, spices, and costly woven fabrics which reached the marts of Europe, and gave the Elizabethan merchants an altogether fallacious view of the staple products of Asia.

The traders of Asia were quite alive to the advantages of substituting sea transport for caravan transport wherever it was possible. The caravan routes

DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1931

- May 1-4. International Aviation Meeting, Pilsen, Czechoslovakia.
- May 3. Flying Meeting. Southern Ae.C., Shoreham-by-Sea.
- May 9. Flying Meeting, Bridgend, Glam.
- May 9. Model Engineer Cup Competition, Sudbury.
- May 14. "Metal-Clad Airship." Lecture, by C. Fritsche, before R.Ae.S.
- May 14. "Petrol Engines for Models" Lecture by E. T. Westbury, before T.M.A.C., Junior Inst. Engineers, Victoria Street, S.W.1.
- May 15-31. Stockholm Aero Show.
- May 16. Reading Ae.C. Meeting.
- May 23. Start of Whitsun Continental Cruise, Heston.
- May 24. N.F.S. Air Pageant, Nottingham.
- May 25-26. Northamptonshire Ae.C. Flying Meeting at Sywell.
- May 30. Heston-Newcastle Air Race, for "Newcastle Evening World" Trophy.
- May 31. N.F.S. Air Pageant, Sherburn-in-Elmet, Yorks.
- June 6. Brooklands Air Meeting.
- June 7. N.F.S. Air Pageant, Hull.
- June 8. International Rally, Bucharest.
- June 20. Flying Display and Air Pageant, Bristol Airport.
- June 21. N.F.S. Air Pageant, Reading.
- June 26. R.A.F. Dinner Club Annual Dinner.
- June 27. Royal Air Force Display, Hendon.
- July 8-11. Blackpool International Meeting.
- July 10-19. Circuit of Italy.
- July 22. Household Brigade Flying Club Meeting, Heston.
- July 25. King's Cup Race.
- July 25-Aug. 9. Rhön Gliding Competitions, Germany.
- Sept. 5. Haldon Flying Meeting.
- Sept. 12. Schneider Trophy Contest.

made for seaports. A glance at the map which we publish on another page shows that the great desert tract is broken by five seas, the Caspian, the Persian Gulf, the Red Sea, the Black Sea, and the Mediterranean. The Caspian is entirely land-locked, and the others are very nearly so. The caravan routes from China and India made for those seas, and other caravan routes on the far shores picked up the merchandise and conveyed it to European ports. It will be noticed also that the five seas indent the desert area, but that none of them actually pierces it right through. Had there been a through sea passage, doubtless the whole of the trade would have been sea-borne, and the camel would never have attained to its pre-eminent position. Possibly, too, the character of the merchandise would have been different, and Vasco da Gama and his fellow adventurers might never have felt the great urge to discover and explore the East. The whole course of history might have been different. It remained for de Lesseps to provide a through sea route by cutting the Suez Canal. Now we think of India as an exporter of jute and rice rather than as one vast mine of gold and rubies.

The coming of air transport does not endanger the profits of the Suez Canal tolls. Though the aeroplane is the extreme opposite of the camel in speed, the characteristics of the two as vehicles of commerce are very similar. Each must carry valuable goods of small bulk. But the aeroplane, in virtue of its speed, has introduced what Sir Philip Sassoon (we hope that he will soon be quite well again) calls the "Third Route" to the East. It is interesting to look again at the map in this issue and to note the extent to which the aeroplane routes are following the old caravan routes, and are making use of the land of the five seas. There are some new developments to be noticed. The Red Sea is for the moment completely disregarded by the airways. On the other hand, one trunk airway from Berlin entirely ignores the land of the five seas, and stretches across the northern tracts of the Eurasian continent. This last is an experiment. All air lines are at present experimental; but this is more of an experiment than most, and no one can yet say with certainty whether this German-Russian line will prove a success and will continue to exist. If it does, it will owe its success to the previous existence of the Siberian railway. It can hardly be taken as an example of aircraft making possible a trade route which would not otherwise have attained importance. The rest of the airways work through the land of the five seas, touching at ports on them, and one airway also includes the Aral Sea on its route.

The aircraft do not transfer their cargoes to ships as the old camel caravans used to do, but obviously the reason why they call at such places as Rostov and Baku is that those towns are ports and owe much of their prosperity to sea-borne trade. The aircraft are still largely dependent upon the seas, although they do not themselves use them. That naturally makes us wonder why they do not use them. Unless local conditions are very unfavourable, it would seem the natural thing that when an airway reaches a sea, the next stage should be

carried on by flying boats. There seems a strange reluctance on the part of flying companies to use seaplanes if they can possibly manage to carry on with landplanes. The Mediterranean is the only one of the five seas which is regularly crossed by flying boats. We are still not convinced that the future of air transport down the Persian Gulf does not lie with the flying boat. When the seaplane does eventually come into its own, the latest trade routes in the land of the five seas will not be very different from the caravan routes of long ago.

* * *

It was a very pleasing little ceremony which took place at Bristol the other day when the Lord Mayor presented a shield bearing the arms of the city to No. 501 (City of Bristol) (Bomber) Squadron.

It was stated that that was the first occasion on which such an event had taken place. Doubtless the Lord Mayor was sure of his facts, though we seem to have some recollection that there had been a similar or analogous ceremony between the Lord Mayor of Birmingham and No. 605 (County of Warwick) (Bomber) Squadron. But even if that were so, there is a distinct difference between the two squadrons. It is not very apparent to the lay eye, and only the very observant are likely to wonder why one of those squadrons is numbered in the 500's and the other in the 600's. The explanation is that the lower set of numbers indicates a Cadre squadron in which there is a proportion of Special Reserve *personnel*, while the higher number implies a squadron of the Auxiliary Air Force, in which there is only a small proportion of Regular *personnel*. In the former case the commanding officer is a Regular; in the latter case he is a citizen airman. It follows that a Cadre squadron is very nearly a Regular unit, which could very rapidly mobilise for war, and which could in an emergency undertake certain operations without feeling absolutely dependent on its non-Regular element being able to turn out at a moment's notice. But the Special Reserve element has the effect of tying the squadron to a certain town or district, and therefore all these squadrons are given names corresponding to their districts. In peace time these Cadre squadrons cannot have their aerodromes permanently changed, as happens every now and then to a Regular squadron. There are only four such squadrons at present in the Air Force List, named respectively after the City of Bristol, Ulster, the County of Lincoln, and the County of Nottingham.

While all fighting units depend very largely for their *moral* on *esprit de corps*, this must be particularly the case with one tied permanently to its own city. The pride of that city in the efficiency of its squadron must have a great deal to do with producing recruits of the right class. Therefore, the closer, the more open and official, in fact the more affectionate, are the relations between the civic authorities and the squadron, the greater the credit which each is likely to reap from the connection. Bristol has set a good example; we hope that it will be followed by others.



THE JUNKERS "JUMO 4" TAKES THE AIR

The new heavy-oil engine produced by the Junkers firm has now been installed in a Junkers F. 24 monoplane and put into service on the German air routes. Rolls-Royce heavy-oil aero engines are being produced in this country.

A CERTAIN amount of information about the Junkers heavy-oil engine was given by Mr. D. R. Pye in his Akroyd-Stuart lecture on December 11, 1930, so that this engine will not be entirely unknown to readers of FLIGHT. On the same occasion also Mr. Pye disclosed the information that two heavy-oil engines were being produced in this country, both being Rolls-Royce petrol engines modified and converted for running on heavy oil.

The Junkers heavy-oil engine, or "Jumo 4" as it is now called, is of the "vertically-opposed" type, i.e., its cylinders are in a vertical plane, and the pistons work in opposition to each other, two in each cylinder, so that on the "down" stroke the two pistons move away from each other, and on the "up" stroke they approach each other. As the engine works on the two-cycle principle there are no valves to operate, but the simplicity peculiar to the two-stroke principle is somewhat lessened by the use of opposed pistons in that the two crankshafts have to be geared together in order to co-ordinate the power from the two pistons. Mr. Pye pointed out in his paper that this was a somewhat bold step in view of the large torque variations.

Dr. Junkers and his fellow workers have been engaged in research and experiments for a very long period of years, and the Junkers works have produced many Diesel engines, chiefly, however, for stationary work or for ship propulsion. But work on heavy-oil aero engines has been proceeding for several years, and in point of fact the first flight with a Junkers heavy-oil engine was made on February 3, 1929. Since that time the Junkerswerke at Dessau have carried out bench tests and flight tests at frequent intervals, and the procedure has been gradually to increase the power at which the engine was tested. For example, we believe the first tests were made at 500 h.p. Then followed tests at 600 b.h.p., and now the engine has been officially tested by the German authorities at 720 b.h.p. maximum. As the engine weighs 800 kg. (1,760 lb.), this figure corresponds to a weight of 1.125



EXPLAINING HOW IT WORKS: Dr. Gasterstedt, one of the designers, explaining to visitors to Tempelhofer Feld the principles upon which the Junkers heavy-oil engine is based.

kg./h.p. (2.44 lb./h.p.), a figure which is fairly close to that for the American Packard radial air-cooled heavy-oil engine, which is of much smaller power.

In point of fact, the Junkers "Jumo 4" should be a very useful engine, quite apart from the fact that it is a heavy-oil engine, for large machines. 720 h.p. in a single unit is suitable for a number of types, while two such units should suffice for very large machines.

The Junkers F.24, fitted with the "Jumo 4" engine, was formally presented at Tempelhof, Berlin, on April 22, and we gather that the machine will now be placed on one of the German air routes for thorough tests under actual operating conditions by the Deutsche Luft Hansa. It will be intensely interesting to see how the new type of engine behaves.

It is pointed out that the "Jumo 4" has a consumption, at $\frac{2}{3}$ power, of 158 grammes per h.p. hour (0.348 lb./h.p./hour), so that on long-distance flights the initial weight of the engine should easily be made up for by the smaller quantity of fuel to be carried.



FOR THOROUGH TESTING IN THE AIR: The Junkers type F.24 into which the Junkers "Jumo 4" heavy-oil engine has been fitted.

THE FIZIR "A.F.2"

A New German "Pusher" Two-Seater

THOSE who, like we, have an opportunity of studying the aviation press of the world, cannot fail to have been impressed by the modern tendency of reverting to the "pusher" type of aircraft in the light plane class. There is scarcely a country in which the pusher principle is not being revived, and the present summer should be of considerable interest in showing what troubles are met with in cooling pusher engine installations. The question of cooling is easily the most serious obstacle to the successful reintroduction of the pusher type of machine. The relative inefficiency of pre-war pushers need not necessarily apply to modern design, although the gap left in our practical knowledge of pushers from the days of the open tail girder type to the modern clean tractor machine, will doubtless require a good deal of research and experiment before we can design pushers which are as efficient aerodynamically as is the modern tractor machine. It is likely that the pusher will always remain slightly less efficient than the tractor, but if the difference is not too great the sacrifice is well worth making for the sake of getting the engine behind the occupants, where not only is less noise transmitted to the cabin, but also vibrations and buffeting, caused by the slipstream of the propeller in front, are entirely absent. To these advantages must be added the possibility of providing an exceptionally good view from the pilot's cockpit, a view far and away better than could ever be obtained with any tractor arrangement.

In this country, the pusher has not so far been seriously tackled. The Hinkler "Ibis" is a twin-engined machine with two Salmsons in tandem, and the propeller of the front engine is, in fact, ahead of the cockpit. For all that the machine does to a large extent, give the advantages of the single-engined pusher. The "Falcon Four," which is now being built at Shoreham, is a twin-engined machine with pusher engines out on the wing, and promises to be a very fine type for the private owner.

In the two-seater class we have not yet attempted to apply the pusher principle, but there is, we think, little doubt that sooner or later this attempt will be made.

In the meantime, it is of interest to see what is being done in this direction abroad, and our esteemed German contemporary, *Flugsport*, of February 18, 1931, contains two photographs and a brief description of a new German machine of the pusher class which, we think, will be of interest to our readers.

The Fizir "A.F. 2" is, in fact, more than an ordinary pusher two-seater, in that it also incorporates the amphibian principle. The machine is a high-wing monoplane with a flying-boat hull of the single-step type. From the sides of this hull, spring short wing stumps, similar to those which Dr. Dornier has made familiar. These wing stumps serve three purposes: they provide lateral stability on the water when the machine is being operated on the sea, they support the wing struts which brace the main monoplane wing, and finally they support the wheels of the land undercarriage in a rather neat way.

The boat hull is of very simple construction, consisting of a light skeleton covered with plywood. It is not easy to make plywood really watertight, and British experience has been that for seaplane floats and flying-boat hulls the material is none too satisfactory as a planking. Water has a habit of getting in, no matter what pains one takes to dope, varnish and paint the surface, and once water has got in under the edge of the ply, swelling and deterioration rapidly set in. However, in the "A.F. 2" it is assumed that the machine is intended mainly as a landplane, and only occasionally to operate on water, on which presumably it will never be left for very long periods, the more so as its

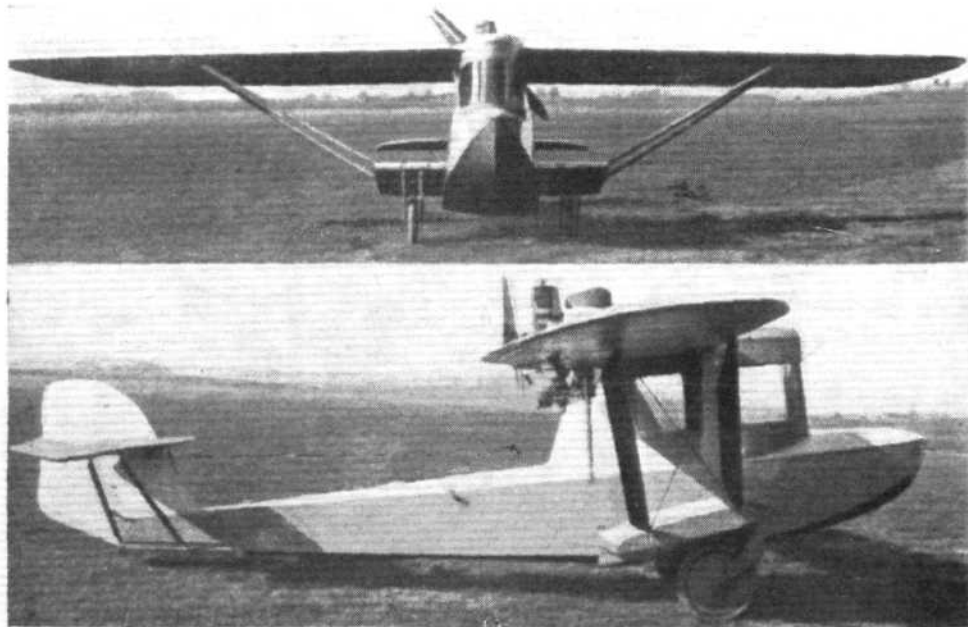
land carriage enables it to be taxied up on the beach immediately after alighting. Under such conditions of use the plywood planking should be satisfactory enough.

The main wing is of all-wood construction with two box spars and plywood covering over the leading edge, the rest of the covering being fabric.

The small wing stumps on the hull are planked with plywood, and have been thoroughly varnished and painted to ensure, as far as possible, watertightness for considerable periods. The method of mounting the undercarriage is neat. At first sight, it looks very similar to the system adopted by Short Brothers on the single-float "Mussel" seaplane, in which a circular section steel tube runs right through the float and carries two wheels on a tubular fork at each end. In the "A.F. 2," however, the system actually differs considerably in principle from that used on the "Mussel." The cross tube does not run through, but extends only just inside the wall of the hull, and, moreover, it differs from that of the Short machine in that the tubes serve merely for swinging the wheels into the up or down position, the load from the landing shocks not being taken by the tubes, but by the wing stumps. The arrangement is ingenious, although it does not, of course, aim at burying the undercarriage and thus reducing head resistance in the manner of a retractable undercarriage.

The engine, a 5-cylinder radial Walter in the prototype, is mounted on the rear spar of the centre section of the wing, and the petrol tank is placed just ahead of the engine. While this arrangement does give simple gravity feed, it is a little difficult to regard with equanimity a petrol tank just ahead of the engine. In the case of a leak anywhere in the tank or petrol system, it is almost inevitable that petrol will be blown on to the hot engine, and the risk of fire would seem to be very considerable. Presumably, there would be no very great difficulty in dividing the petrol among two tanks mounted some little distance out-board in the wing, when there should be considerably less danger of getting petrol blown on to the engine.

Normally, the "A.F. 2" is intended to be used as an open touring machine, but provision has been made for the addition of a cabin top, and the machine is shown in the photographs with this in place. Personally, we do not think that in a pusher type, where there is no slipstream to worry the occupant, the cabin top is necessary, or even desirable. Good wind screens will provide all the protection required, and the freedom and pleasure of flying in an open machine in which there is no draught is, we think, one of the greatest points in favour of the pusher type. For winter flying there might, of course, be a good deal to be said for the cabin top. Altogether, the "A.F. 2" is rather an interesting



THE FIZIR "A.F.2": These two views show most of the main features of the machine. The cabin top is detachable.

little machine, and, although its performance is not startling, it is certainly not unduly poor, in view of the fact that the machine is an amphibian.

The main dimensions of the "A.F. 2" are as follows:—Span, 11.2 m. (36 ft. 8 in.); length, 7.10 m. (23 ft. 4 in.); height, 2.70 m. (8 ft. 10 in.); wing area, 16 sq. m. (172

sq. ft.); weight, empty, 460 kg. (1,013 lb.); disposable load, 230 kg. (507 lb.); gross weight, 690 kg. (1,520 lb.); wing loading, 43 kg./m.² (8.84 lb./sq. ft.); power loading, 7.10—8.10 kg./h.p. (15.6—17.8 lb./h.p.); maximum speed, 140 km./h. (87 m.p.h.); landing speed 60–65 km./h. (37–41 m.p.h.); ceiling, 3,500 m. (11,500 ft.).

THE CANADIAN "CUB"

A low-powered single-seater light 'plane, designed and built in Canada, which, fitted with a 40 h.p. A.B.C. "Scorpion II" engine, has demonstrated a very satisfactory performance



THE "CANADIAN CUB": A single-seater light 'plane designed and constructed in Canada, and fitted with a 40 h.p. A.B.C. "Scorpion II."

ALTHOUGH a "private" venture on the part of two Englishmen, Mr. G. W. Saynor and Mr. R. N. Bell—formerly of the R.A.F. and late of the design staff of the Blackburn Aeroplane & Motor Co., Ltd., at Brough—the "Canadian Cub," which was recently designed and constructed by them in Montreal, is worthy of any first-class commercial production job. Its performance is remarkably good, having proved to be well behaved in the air, free from vices, and has performed all the usual aerobatic feats.

On one occasion it was flown from Montreal to Ottawa when the temperature was 18° below zero, and functioned perfectly all the way, while it has also been flown in a maximum temperature of 20° below zero. The "Cub" has been stressed by the AED at Ottawa for aerobatics to an all-up weight of 780 lbs., and has been approved by the AED. The "Cub" is a single-seater high-wing monoplane, at present fitted with a 40-h.p. A.B.C. "Scorpion II" engine, although it has been stressed to take an engine of up to 60 h.p., such as the "Salmson." With the "Scorpion," however, this machine has a maximum speed of 100 m.p.h. and a landing speed of about 44 m.p.h., while the service ceiling is 10,000 ft. and the initial rate of climb of 500 ft./min.

By giving the wings a pronounced sweep-back it has been possible to avoid a long nose in the fuselage—which generally obtains in machines having such a light engine as the "Scorpion." Thus, apart from any advantage that may be obtained as regards stability, the "Cub" possesses a pleasing well-balanced appearance, with its comparatively short monocoque fuselage of elliptical cross-section.

The pilot's cockpit is located immediately behind the wings, and an adjustable parachute-type alclad bucket

seat maintains the height of the pilot's eye level with the trailing edge, providing excellent visibility both upwards and downwards.

Another feature of the "Cub" is that the centre section of the wing is built integral with the fuselage, and contains the main petrol tank of 7½ gal. capacity, forming a rigid structure to which the main spars of the wings are attached. The wings, it will be observed, are braced by a pair of V struts on either side of the fuselage.

A sturdy undercarriage, equipped with "doughnut" wheels, is provided, and telescopic tubes connected by shock-absorbing cord rings form the springing gear for the tail-skid.

Apart from sport purposes, the "Cub" is, we should think, particularly suitable for advanced or Service training, and for solo flying for Club members who wish to increase their "hours."

The principal characteristics of the "Cub" are:—Span, 25 ft.; overall length, 18 ft.; overall height, 6 ft. 1½ in.; wing area, 98 sq. ft.; weight empty, 483 lb.; disposable weight, 190 lb.; fuel and oil, 77 lb.; total loaded weight, 750 lb.; wing loading, 7.65 lb./sq. ft.; power loading, 18.8 lb./h.p.; speed range, 44–100 m.p.h.; rate of climb, 500 ft./min.; service ceiling, 10,000 ft.; range (4 hours), 320 miles.

THE PRINCES FLY HOME

THE R.H. the Prince of Wales and Prince George travelled from Lisbon to Bordeaux on H.M.S. "Kent," and at the latter port they found the Imperial Airways Argosy "City of Glasgow" (G-EBLF) waiting for them, with Capt. Olley as pilot. The interior of the fuselage had been re-furnished so as to provide one state room for the two Princes and one for their staff. The Argosy took off from the aerodrome at Bordeaux at 2.44 p.m. on Monday, April 27, and arrived at Le Bourget at 6.10 p.m. after a rough and tiring flight of nearly 3½ hours. The next day was spent in Paris, paying certain visits, including one to the ex-Queen of Spain at Fontainebleau. The journey was continued in the Argosy on Wednesday, April 29. The flight was fairly calm, but there was some fog, and the visibility was not good. Two R.A.F. flying boats escorted the Royal machine across the Channel. The Argosy crossed the coast near Dungeness, and flew up the Edenbridge valley, over Dorking, to Windsor, where a landing was made soon after 1 p.m. on Smith's Lawn in Windsor Great Park. H.R.H. the Duke of York was there to greet his brothers, they all

then motored to Windsor Castle, where the King and Queen are in residence.

This great tour of the Princes has done a great deal to foster British trade with the South American republics, and in particular it has been a great advertisement of British aircraft. The Princes have flown whenever it was possible to travel that way. In the Argentine the Prince of Wales, of course, used his own "Puss Moth," and when two aircraft were required the resident representatives of The de Havilland Aircraft Co., Ltd., placed a second "Puss Moth" at the disposal of Prince George. The Prince of Wales' machine had especially hard usage, and a great mileage was covered. In spite of this, absolute reliability was maintained, and no trouble whatever was experienced in the course of any of the long flights undertaken. On one occasion, when Flight Lieut. Fielden, the Prince of Wales' personal pilot, was making a prolonged survey of widely separated estancias, where he would be landing, the Prince of Wales' "Puss Moth" accomplished 9½ hours' flying in one day at an average speed of 112 m.p.h.

THE ROYAL AERO CLUB OF THE UNITED KINGDOM

OFFICIAL NOTICES TO MEMBERS

REPORT of Meeting of the Committee, held at 3, Clifford Street, London, W.1, on Wednesday, April 22, 1931, at 5 p.m.

Present:—Lieut.-Col. Sir Francis K. McClean, A.F.C., in the Chair; Commander James Bird; Captain H. S. Broad; Major A. R. Goodfellow; Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S.; Captain A. G. Lamplugh; Colonel F. Lindsay Lloyd, C.M.G., C.B.E.; Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C.; John Lord; Major H. A. Petre, D.S.O., M.C.; Captain C. B. Wilson, M.C. In attendance, H. E. Perrin, Secretary; B. Stevenson, Assistant Secretary.

Election of Chairman.—On the proposal of Sir Francis McClean, seconded by Air Vice-Marshal Longcroft, Sir Philip Sassoon was unanimously elected the Chairman for the year 1931.

Election of Vice-Chairman.—On the proposal of Sir Francis McClean, seconded by Major A. R. Goodfellow, Lieut.-Col. M. O'Gorman was unanimously elected Vice-Chairman for the year 1931.

Election of Members.—The following were elected members of the Club:—Flight Lieut. Hugh Wolfe Corner, Stanley James Gilbert, Arthur Richards Goddard, William Herbert Peak, Henry George Sydney Robson, Samuel Edgar Rodman, Lieut.-Col. Louis Arbon Strange, Eric Teesdale, William Arthur Welch, William A. M. Burden.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

9733	E. L. Ridley-Thompson ..	Hampshire Ae. C.
9734	Rex Bennett ..	Cinque Ports Fl. C.
9735	Leonard S. Hiltbrunner ..	Cinque Ports Fl. C.
9736	Arthur R. Hunt ..	Newcastle Ae. C.
9737	Maitland W. S. Boucher ..	Airwork Fl. School.
9738	Geoffrey R. Whitelaw ..	London Ae. C.
9739	Gilbert B. Summers ..	De Havilland Fl. School.
9740	Anthony C. C. Myers ..	London Ae. C.
9741	James H. Thompson ..	Hull Ae. C. (N.F.S.).
9742	James H. Ashworth ..	Lancashire Ae. C.
9743	Christopher J. Heming ..	London Ae. C.
9744	Thomas J. Mammatt ..	London Ae. C.
9745	John E. Greenwood ..	Hanworth Club (N.F.S.).
9746	Joseph L. Masheter ..	Hanworth Club (N.F.S.).
9747	T. L. McClintock Lonsdale ..	Airwork Fl. School.
9748	Ernest Batchelor ..	Leicestershire Ae. C.
9749	Drummond L. de Villiers ..	Airwork Flying School.
9750	Robert Russell ..	Cinque Ports Fl. C.
9751	Ian S. Barr ..	Brooklands Fl. School.
9752	Gabrielle R. M. Burr ..	Phillips & Powis Fl. Sch.
9753	David A. Gill ..	Cinque Ports Fl. C.
9754	Charles J. Maclean ..	Cinque Ports Fl. C.
9755	Herbert C. William Brewer ..	Cinque Ports Fl. C.
9756	Harry M. A. Day ..	Royal Air Force.
9757	Terrence A. Coggan ..	Surrey Fl. Services.
9758	Harold Chater ..	Cinque Ports Fl. C.
9759	George H. Miles ..	Southern Ae. C.
9760	Herbert G. Beech ..	Surrey Fl. Services.
9761	Leonard A. Watson ..	Hull Ae. C. (N.F.S.).
9762	Ronald W. Harker ..	Newcastle Ae. C.
9763	R. E. Pancoast-Bliss ..	Brooklands Fl. School.
9764	Christian A. Ravn ..	Hanworth Club (N.F.S.).
9765	William H. Craven ..	Midland Ae. C.
9766	Arthur J. J. Chell ..	Midland Ae. C.
9767	John F. Jefferson ..	Midland Ae. C.
9768	Arthur G. Mosely ..	Midland Ae. C.
9769	Herbert M. Crabbe ..	Midland Ae. C.
9770	Claude McClean Vincent ..	R.A.E. Ae. C.
9771	Frederic V. Warren ..	Marshall's Fl. School.
9772	W. H. Rhodes-Moorhouse ..	Airwork Fl. School.
9773	T. H. Nash-Peake ..	Bristol & Wessex Ae. C.
9774	Alfred J. Mame ..	Airwork Fl. School.
9775	William R. P. Templeton ..	Lancashire Ae. C.
9776	Alec C. Gregory ..	Lancashire Ae. C.
9777	Islay M. M. Balfour ..	Berks, Bucks & Oxon Ae. C. (N.F.S.).
9778	Thomas C. Brett ..	Hanworth Club (N.F.S.).
9779	Herbert M. Brown ..	London Ae. C.
9780	Benson Herbert ..	Newcastle Ae. C.
9781	Eric R. Platford ..	Nottingham Ae. C. (N.F.S.).
9782	James Yuan Fu ..	Yorkshire Ae. C. (N.F.S.).

9783	George Hibbins ..	London Ae. C.
9784	Arthur E. Hagg ..	De Havilland Fl. School.
9785	Sidney Cotton ..	Hanworth Club (N.F.S.).
9786	Noel P. L. Murphy ..	Phillips & Powis Fl. School.
9787	Bruce B. Bossom ..	Hanworth Club (N.F.S.).

Gliding Certificates.—The following Gliding Certificates were granted:—

129	Leonard E. Falla (A) ..	Preston & Dist. G.C.
130	Arnold G. Wilson (A) ..	Leeds Gl. C.
131	Angus C. S. Irwin (A) ..	London Gl. C.
132	Leslie Allen (A) ..	Portsmouth & Southsea Gl. C.
133	Reginald W. Etchells (A) ..	Surrey Gl. C.
134	Henry L. Richardson (A) ..	London Gl. C.
14	Leonard C. Williams (B & C) ..	London Gl. C.
26	Joseph M. Symons (B & C) ..	London Gl. C.
27	Alexander N. Stratton (C) ..	Surrey Gl. C.
59	Henry Petre (B & C) ..	London Gl. C.
84	Cornelius J. Donovan (B & C) ..	London Gl. C.

Britannia Trophy.—The Committee unanimously awarded the Britannia Trophy for 1930 to Air Commodore Kingsford Smith for his flight from Ireland to Newfoundland on June 24-25, 1930, and his flight from England to Australia on October 9 to 19, 1930.

Stewards, 1931.—The following Stewards for the year 1931 were unanimously elected:—Brig.-Gen. The Duke of Atholl, K.T., G.C.V.O., C.B., D.S.O.; The Rt. Hon. Lord Hugh Cecil, M.P.; Lord Cozens Hardy; Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S.; Lieut.-Col. J. T. C. Moore-Brabazon, M.C.; Colonel Sir Joseph Reed.

Sub-Committees, 1931.—The following sub-Committees for the year 1931 were elected:—

Racing Committee.—Lieut.-Col. W. A. Bristow; Lieut.-Col. M. O. Darby, O.B.E.; Major C. J. W. Darwin, D.S.O.; Col. F. Lindsay Lloyd, C.M.G., C.B.E.; Major R. H. Mayo, O.B.E.; Sq.-Ldr. H. M. Probyn.

Representatives of General Council.—Major A. R. Goodfellow; R. Ashley Hall; Fl./Lt. D. W. J. Bonham-Carter.

Technical Committee.—Major T. M. Barlow; Major J. S. Buchanan, O.B.E.; R. S. Capon; Sq./Ldr. T. H. England, D.S.C.; W. O. Manning; Major R. H. Mayo, O.B.E.; Lieut.-Col. M. O'Gorman, C.B.; Lieut.-Col. H. W. S. Outram, C.B.E.; Sq./Ldr. M. E. A. Wright, A.F.C.

Finance Committee.—Ernest C. Bucknall; Lieut.-Col. M. O. Darby, O.B.E.; John Lord; J. Stewart Mallam; Lieut.-Col. Sir Francis K. McClean, A.F.C.

House Committee.—Ernest C. Bucknall; Major A. Q. Cooper, D.S.C., A.F.C.; Major H. J. Corin; J. Stewart Mallam; Major H. A. Petre, D.S.O., M.C.; Lieut.-Col. D. C. Robinson, M.C.; Major S. V. Sippe, D.S.O.

Flying Services Fund Committee.—Lieut.-Col. Alan Dore, D.S.O.; John Lord; Major H. A. Petre, D.S.O., M.C.

Touring Committee.—Major K. M. Beaumont, D.S.O.; Captain H. S. Broad; Major C. J. W. Darwin, D.S.O.; A. H. Downes Shaw; A. C. M. Jackaman; W. Lindsay Everard, M.P.; I. H. McClure; R. L. Preston.

General Council.—The Rt. Hon. Sir Philip A. G. D. Sassoon, Bart., P.C., G.B.E., C.M.G., M.P.; Major K. M. Beaumont, D.S.O.; Lieut.-Col. M. O. Darby, O.B.E.; Captain A. G. Lamplugh; Col. F. Lindsay Lloyd, C.M.G., C.B.E.; Lieut.-Col. M. O'Gorman, C.B.

Joint Standing Committee (Royal Aero Club & S.B.A.C.).—Lieut.-Col. M. O'Gorman, C.B.; W. Lindsay Everard, M.P.; Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C.

Joint Standing Committee (Royal Aero Club, Royal Aeronautical Society & Air League).—Lieut.-Col. M. O'Gorman, C.B.; Lieut.-Col. J. T. C. Moore-Brabazon, M.C.; Major H. A. Petre, D.S.O., M.C.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W.1.
H. E. PERRIN, Secretary.

Airport News

BRISTOL NOTES

ON Saturday, April 25, the Lord Mayor of Bristol, Alderman F. F. Clothier, accorded a civic welcome to the officers of No. 501 (City of Bristol) Bomber Squadron, R.A.F., at the Airport of Bristol, Whitchurch. The squadron flew over in their Westland Wapiti aircraft, and landed a little late owing to the bad weather. The officers of the squadron were first presented to the Lord Mayor, after which he entertained them to tea, and then presented them with a shield bearing the coat of arms of the city. In his speech, the Lord Mayor referred to the fact that a civic welcome had already been accorded to their own particular unit of the Royal Navy, H.M.S. "Bristol," as had been done by other towns to many other ships, but he said he understood that the ceremony which was taking place to-day was unique, in that it was the first occasion when a city had given a civic reception to its own particular unit of the R.A.F. During the afternoon the squadron was on view to the general public, of whom a large number took the opportunity to see the machines at close quarters. The occasion was doubly interesting in that not only the men, but the machines and engines themselves were products of the West Country. The aircraft were Wapitis built by the Westland Aircraft Works at Yeovil, while the engines were Jupiter VI's from the Bristol Aeroplane & Engineering Co. After the presentation the squadron took off individually, since, although on arrival they had been able to land in flight formation, by now the weather had become considerably more gusty, and it was considered inadvisable to take off in a similar manner. Air Commodore W. F. MacN. Foster, the Air Officer Commanding No. 1 Air Defence Group, together with Mrs. MacN. Foster, was present during the afternoon, as well as many other visitors, including representatives from the Westland Aircraft Works.

During the afternoon Flight-Lieut. Russell, the Sales Manager of the Redwing Aircraft Co., arrived in one of the latest of his firm's products, thereby routing the idea that the Redwing is not a suitable machine to fly in bad

weather. He had, of course, made a comparatively slow journey from Croydon, since he was fighting a head wind the whole way, but it had otherwise been quite pleasant. His control over the machine was well demonstrated, as he unfortunately got a very bad bump just as he was about to land, which nearly dropped the machine on the ground, but he recovered skilfully and landed the machine quite gently. The side-by-side seating of such a machine offers real attraction to those who wish to use aircraft in a sociable manner, and who are prepared to sacrifice a small amount of top speed for this great advantage. A flight in the Redwing will very soon prove to anyone that the tandem arrangement is completely out of date when it comes to long cross-country flights, for in a Redwing the passengers can talk in comparative comfort and relieve what may have often been in danger of becoming a tedious journey. On the previous Saturday, April 18, Mrs. Sennington, wife of Alderman Sennington, the Chairman of the Airport Committee, performed the ceremony of opening the Air Taxi service, run by Phillips & Powis, of Reading, at the Bristol Airport. Their machines have already undertaken several jobs for the local newspapers, and we anticipate that the business men of Bristol will show that farsightedness for which they are well known by patronising this service very well indeed.

On Sunday afternoon, April 26, the Director of Civil Aviation, Col. Shelmerdine, together with Mrs. Shelmerdine, paid his first visit to the Bristol Airport. This was of an unofficial nature, and Col. Shelmerdine left after making an inspection of the aerodrome and buildings.

The large new hangar, together with a range of lock-ups, which is being built by Airwork, Ltd., as their Service Depot, is now nearing completion, and makes a very imposing structure.

Merlyn Motors, Ltd., who maintain a showroom at the Airport, have now obtained the sole agency in Great Britain for the Civilian Coupé. This machine was fully described in FLIGHT for April 10, and will shortly be available for inspection at their showroom.

HESTON NOTES

HESTON AIR PARK was the scene of much activity on Sunday afternoon, April 26, when Capt. F. Hawks gave a demonstration of the flying capabilities of his machine. He was the guest at a small luncheon party given by Mr. Nigel Norman, and proved himself an entertaining and witty conversationalist. After lunch we were privileged to be shown over the machine by Capt. Hawks, and since our description in FLIGHT of April 24, we discovered a few further points of interest. It came to light during the lunch that Capt. Hawks had flown over the clouds from somewhere about Rheims to as far as Milan on his recent flight to Rome, and we asked him what special instruments he used when flying "blind" if he had to do so. He showed us a comparatively unknown pitch and bank indicator, which he said he had complete faith in and had used for a number of years. This is made by a Mr. Schenk of Los Angeles, and takes the form of a gyro rotating horizontally on a vertical bearing; this is driven by a direct air blast from a Venturi tube by cups around its periphery. Arising vertically from the centre of the gyro wheel is a pin with a small yellow head, and over this pin is a domed glass cap with cross lines on it. The instrument is particularly easy to follow, for as the aircraft moves about the gyro, the apparent motion of the pin is exactly that which is required on the control stick to bring the aeroplane back to its normal flying position, thus when the aircraft dives the pin appears to move back towards the pilot, and he pulls the stick back; similarly when the left wing drops the pin moves to the right and the pilot pulls the wing up by moving his stick to the right until a central position is reached again. Capt. Hawks said he had never had any trouble with it at all, and uses it in conjunction with his compass, which latter he relies upon for telling him when he is yawing. This pitch and bank indicator is mounted directly before the compass, both of which are placed

centrally on the floor of the cockpit in front of the control column. As a check, he also has a Pioneer Turn Indicator and Climb Indicator, and all his instruments are laid out on a dashboard of his own design, so that, generally speaking, when climbing or diving the pointers rotate in the same direction.

Another instrument which he says has greatly facilitated his keeping a good course on long distance high-speed flights is the Pioneer Drift Indicator. This is situated on the floor of the cockpit to the right of the pilot's seat, and is of the direct reading kind, with drift lines on a rotatable screen, so that an object on the ground can be sighted and lined up to follow these lines, enabling the pilot to read off his drift directly from a scale.

After lunch Capt. Hawks demonstrated his aircraft to the quite considerable crowd which had turned up, and showed that it had an astonishing speed range, for at times he flew in station behind a Moth, while at others he flew in rings round the same machine. The visitors had come from many other aerodromes, and there were about 25 aircraft of various types lined up on the tarmac.

The concessions asked for jointly by Airwork, Ltd., and the Egyptian Bank for the purpose of establishing direct service in Egypt have been approved by the Egyptian Minister of Finance, and Mr. Alan Muntz has left for Cairo to settle further details. The new Anglo-Egyptian Company which is to be formed will take over the Almaza aerodrome, teach flying, sell and repair aeroplanes, and operate with the newly-formed Egyptian Aero Club, Cairo. It is understood that the new Company will co-operate with the newly formed Egyptian Aero Club. Among the regular services which are spoken of are those for the benefit of tourists between Cairo and Jerusalem and Cairo and Aswan. The time of these journeys can be shortened from the 15 hr. which they at present take by train, to 3 hr. when done by air.

A DINNER TO SOME PIONEERS

THE Aviation Section of the Forum Club, under the chairmanship of the Hon. Mrs. Forbes Sempill, gave a dinner at the club to some of the pioneers of aviation on Tuesday, April 28.

MRS. SEMPILL, as Chairman, made an exceptionally able and well-chosen speech of introduction, and paid tribute to the very earliest pioneers in a manner which showed that she was thoroughly conversant with all her facts.

The first to say a few words was Mr. GRIFFITH BREWER, who explained that his experience dated back to 40 years ago, when, at the Naval Exhibition at Chelsea in 1891, he made his first balloon ascent, together with Pat Alexander. In a graphic description he explained how gusty the day was and how they shot up well above the clouds, and after a series of vicissitudes finally came down on Leith Hill, somewhere near his own home. An amusing sequel was his father's description to him that evening of how he had seen some young fools go up in a balloon and be terribly knocked about, and how he felt sure that they must now all be dead. The silence, Mr. Brewer said, when he explained to his family that he was one of those "young fools" was one of the worst moments of his life. His first aeroplane flight was, as everyone knows at Le Mans, with Wilbur Wright, when Rolls, Baden Powell and Hedges-Butler were also hoping to go. He, however, was the fortunate one asked to make the ascent, and was in consequence the first Englishman to do so.

SIR ALLIOTT VERDON ROE told us how he started out as a marine engineer, and, after seeing albatrosses soaring about, made models to imitate them, and wrote to *The Times* about these. They, much to his surprise, published his letter, and also an article which showed that flying was quite impossible and dangerous to attempt. Eventually, however, he built a machine at Brooklands in which he managed to hop a few yards, and subsequently took it to Lea Marshes. In conclusion, he gave a few details of how the Avro machines, which were evolved from this one, were used as training machines, and how the first Zeppelin was brought down by means of one.

LT.-COL. J. T. C. MOORE-BRABAZON, in his usual polished style, started in a humorous way with a story which is told of Wilbur Wright, who, when asked to speak, said "there is only one bird which can speak well, and that is a parrot, which, as everybody knows, is a notoriously bad flyer." Sir Alliott Roe, he said, must therefore be an exceptionally good pilot. (Sir Alliott is a very diffident and modest speaker.—ED.) Few people realised, he said, how much we owed to Mr. Griffith Brewer, who, by virtue of being a very good friend of Wilbur Wright, had done a very great deal for this country, not the least of which was the fact that it was entirely due to him that Wilbur Wright's machine was now housed in the Science Museum instead of being in another country. He then told us how he had worked alongside A. V. Roe, as he knew him, at Brooklands, building a machine, and he told us how, when wishing to fly, he had had to go up without his coat or boots in order to get the machine light enough to get off the ground at all. This he seldom did, however, and he said they certainly were not heroes, because they could never really get damaged, since the machines practically never got up. Aviation, he said, was very greatly handicapped by the war, and by the fact that the military value of aircraft was realised at such an early date. They all hoped now, he said, that aircraft would become an internationalising factor, and this would greatly be helped when women flew as a general rule.

SIR FRANCIS MCCLEAN said that Mr. Griffith Brewer first taught him to fly, and introduced him to Wilbur Wright in December, 1908. He described how, at Eastchurch, they used to look for the bumps on the aerodrome and then taxi hard at these bumps in the hope of being thrown up into the air and thus fly for a few yards. He recalled how, later on, they were always told that they could not turn to the right with a Gnome engine, but one day he nearly ran into a tree and had to turn to the right, and, after that everyone else followed suit, finding it was not so dangerous as they had been told. He was very lucky to be able to have a photograph of himself in the air in those days, and this was done by getting a photographer to lay on the ground in front of him and, by the Grace of God, he just missed the photographer, who thus got a beautiful photograph. The Short Bros., he said, were also at Eastchurch in those days, and on one occasion Horace

Short wished him to fly into a large net in order to test out a method by which landings might be made on board ships, but he declined gracefully. It was also Horace Short, he said, who put another Gnome engine in front of his machine, and it flew very well indeed, but, unfortunately, he could never make it fly level; you either had to climb and subsequently slide back into the ground with your tail or dive straight away with your nose into the ground. It was with this machine that on one occasion, when the Kent Automobile Club came to the aerodrome, that he took up two old ladies for a joy ride. They looked round when he had got them firmly fastened in, and said, after due inspection, "We think, sir, that, should it be necessary, we just have room to be sick without inconveniencing you."

CAPT. DE HAVILLAND, under pressure, said that he had built his first machine with the help of one small boy, and that eventually they had made it fly for about 5 sec., after which it broke up. He also used to get his brother, he said, to lay on the ground in order to see whether they were actually in the air or not. With great modesty, Capt. De Havilland then skipped the large range of machines, which bear his name, until he came to the Moth, which he said was built solely for selfish motives, as he wanted a cheaply-built machine, which was easy to fly, for himself. In conclusion, he said he would like to associate himself with Lt.-Col. Moore-Brabazon in the remarks he made about the value of women in aviation.

MR. GORDON ENGLAND said that he started flying with José Weiss, whose merits had never really been sufficiently recognised. The machines they used to build, with the help of bamboo, string and tyre cement, were very much more elementary than the Rolls-Royce type of thing which Mr. Brewer and Frank McClean used to fly. The first real flight he ever made, he said, was from the top of Amberley Mount, in Sussex, and he had complete faith in the machine since José Weiss said it would fly. They pushed him off from the top of the hill and he promptly went up to 100 ft. above his starting point, which was, of course, actually making a soaring flight as we know it nowadays. Then he eventually made a prolonged glide right down into the valley. The machine really flew exceptionally well, and he had complete faith in it, he said, but unfortunately it had no controls at all. When they put a motor in it, however—a 40-h.p. N.V.—they were not so successful, and on the sands of Littlehampton he did nothing more than scrape the skin off his face when he overturned. He was fortunate, he said, in being an early test pilot, and he remembered how on one occasion they eventually got a machine to fly well, but it unfortunately broke to pieces when over the sewage farm at Brooklands. Luckily, however, it laid him down in a soft spot and he was not hurt! He was particularly interesting when he described the Secret Circle Plane built by Cedric Lee, at Shoreham. They had complete faith in this, and everyone believed that it would solve all the problems of flight and was, therefore, a dead secret, and, consequently, was built by a staff, all of whom were armed with Webley-Scott revolvers. Finally, one November morning, he took off in this machine, and found that everything was absolutely all right, and instead of just doing one circuit he felt so satisfied with the machine that he went off across country. He came back successfully, but, unfortunately, just as he was coming in over the hangars, the engine cut out and the machine promptly looped the loop and crashed into the telephone wires on the railway embankment. Mr. Gordon England finished with an impassioned plea for greater interest to be taken in gliding, which he said was the secret of making the youth of the country airminded.

CAPT. BARNWELL said that he really ought to speak for his elder brother, as he was the real pioneer, and he started in 1906 to build aircraft, together with one mechanic and a joiner. They also built their own engines and several machines, he said. The first one, however, was rather a disgrace, for although they never got more than one wheel off the ground they did not even smash it, and finally dismantled it. The next machine, he said, was a large Biplane, in which they used a Humber 4-in. T.T. engine, driving two geared propellers.

LT.-COL. MOORE-BRABAZON closed the Dinner with a vote of thanks to Mrs. Sempill, and expressed the hope that she would shortly take her pilot's ticket.

Private Flying & Club News

HANWORTH CLUB.—On Monday evening, April 27, Sir Alan Cobham presided over a dinner given to Capt. Hawks at the Hanworth Club. Amongst those present were Capt. and Mrs. Hawks, Major and Mrs. Cooke, and Mr. and Mrs. Elliott, of the Texas Oil Co.; Capt. the Hon. F. E. Guest, Miss Diana Guest, Lady Drogheda, Major Mealing, Mr. C. C. Walker, Capt. Max Findlay, and many other members and officials of the club. After dinner Sir Alan, in rising to welcome Capt. Hawks, made reference to their guest's well-known record flights across the American continent and the more recent flight to Rome and back, and said he did not know how they were done, since, when he himself had made any long flights, he got thoroughly bruised and usually felt sick or had a bilious attack at the end. In referring to Mrs. Hawks, Sir Alan said that she had travelled over 90,000 miles by air and was probably one of the most experienced air passengers in the world. He also referred to the towed glider flights which Capt. Hawks had made, and visualised aerial tailing parties of the future something on the lines of the better-known variety now held in Switzerland. He pleaded for Capt. Hawks to come over here for a longer stay, and to make a tour of our towns in an endeavour to awake municipal authorities to the importance of establishing landing grounds. In conclusion, he said that all his own long-distance flights had proved that aerial travel as it is to-day is far too slow, and that we must do something about it on the lines that Capt. Hawks had done. There was, however, one drawback, he said, and that was, before very long, when we came to look upon flying at 1,000 m.p.h. as the ordinary thing, we should, when we flew west, never get beyond breakfast time, and should therefore never be able to have lunch or dinner. By way of comic relief, he told a story which had recently occurred to Capt. C. Barnard at a dinner, when asked by a lady if he flew, he said "Yes, he did," and remarked that he had been on a long-distance flight to the Cape with the Duchess of Bedford. His hearer exclaimed, "How magnificent for you, you were in such excellent hands, weren't you?" Sir Alan paid tribute to Capt. Hawks' machine, and said that they all appreciated his coming very much indeed.

Capt. Hawks, in opening his reply, referred to the report which had appeared in a certain journal to the effect that he was an Australian, and said that, now they had heard him speak four words, they would have no doubt where he really did come from. He did not feel justified, he said, in talking on the subject of speed, since all records, as well as the fastest machines, were held by England. Capt. Hawks is an amusing speaker of the impromptu type, and such a speech as his very naturally loses most of its humour when reported in print. From the time he got up until the time he sat down he kept everyone laughing, and told us a very great deal about American aviation, though he was cracking jokes the whole time. He first of all gave what he called the international part of his speech by saying that both the English and Americans had the same colour of skin and hair and spoke the same language—at least some of them did—and he hoped that flyers would be instrumental in dispelling any small differences which might now be present. He gave us a very brief *résumé* of his life, and interpolated into this many amusing incidents. At one time, he said, he was flying with Casey Jones in an Ireland Amphibion over Louisiana, which he explained was a very good State to be away from! The country, he said, was nothing but trees, and

altogether very bad for flying over. Casey was apparently flying the machine, when he got tired of doing so, and passed the control column over to Hawks, with the request to fly it awhile. Whether it was by design or accident that this moment coincided with the engine quitting work Capt. Hawks never knew, but he said that Casey Jones was evidently a very careful pilot, and took no risks, especially when he put them on to someone else.

Like many American pilots, Capt. Hawks apparently started after the war on a Barnstorming tour, and he did so in Texas with a J.N.4D. His description of the rancher from whom he was forced to ask the way, and who said that he did not know where the road went to in either direction, but whom, when asked what he did know, affirmed that at least *he* was not lost, was really funny.

He would like to thank the company, he said, who had been so good in giving him the machines and equipment with which to make these tours, because, he said, that without a "sugar daddy," as they called them in the States, who would back you with suitable equipment, it was quite impossible to do anything at all.

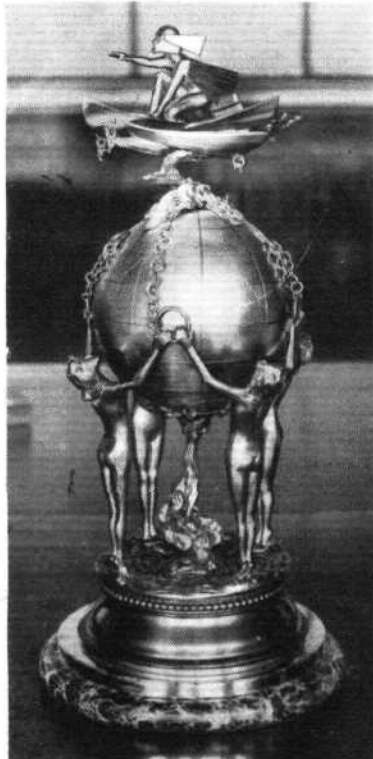
It was after flying a Lockheed for the company, he said, that he first got the idea to get something really fast, because over there the distances which they cover are very great indeed—not at all like in England, where, if you are not careful, you run into water in any direction (this, as Capt. Hawks remarked, was good propaganda for flying boats). What he always wanted to do, he said, was to catch up with the sun, so that he would always be able to land in daylight, and this he really did when flying from New York to Los Angeles; in fact, he was able to play nine holes of golf with his father after arriving there—and, indeed, would have played eighteen but for the fact that his father was beating him!

He illustrated the question of time more fully when he said that there is twenty minutes' difference in the time kept at Brussels and that at Rotterdam and the other day when he flew from the former to the latter, he left at 4 p.m. and arrived at 4 p.m., and if he had opened up the throttle a little more he felt sure he could have arrived before he left.

We were also treated to a very humorous description of a trip he made with Will Rogers, giving shows in aid of the Red Cross. When they started, Will Rogers was given a parachute and told how to use it, and he naturally asked what the ring was for and why it was there. Hawks described how you had to count five after you jumped out and then pull the ring for the parachute to open. It was placed there, he said, in reply to Will Rogers' query, after consultation with the medical authorities, because they came to the conclusion that when you jumped you would sort of reach for your heart, and the ring would then just naturally come to hand. "Gee," said Will Rogers, "I guess if I reached for my heart when I jumped I should choke myself." Many more stories followed, both of this same tour with Rogers and of other tours which Hawks took on his own.

Finally, he said he regretted very much that he would be unable to meet more flying men over here, but that he certainly hoped to come back again later.

His description of the difficulties he had during his flight back from Rome was amusing to a degree, and his designation of ground officials on aerodromes as "Kiwis," so-called because the Kiwi is a bird who talks a lot and doesn't fly, appeared peculiarly apt. He finished by thanking everyone for the hospitality he had had while here, and hoped that if anybody went to the



The Trophy presented by the Newcastle "Evening World" for the Heston—Cramlington race, to be held on May 30.

States they would give him a chance of treating them in the same way.

Capt. Guest replied with a short speech, and said that he was unable to be serious since Sir Alan Cobham had been so, and he certainly could not be funny after Capt. Hawks' speech, and he said that he viewed with very great satisfaction the definite trend there was towards an international spirit amongst flying men. He felt sure that England and the U.S. together would be supreme in the air, and he thought it exceptionally sporting of the Americans to make room for our airship men over there, in order that they might continue their training and fit themselves for further airship work later.

BROOKLANDS SCHOOL OF FLYING.—A reception station and club house will be erected and ready for occupation in October at Brooklands. The premises will provide, restaurant, lunch bars, observation control tower and accommodation for the executive staff. These improvements mark a further step in the plans by which it is hoped to make Brooklands aerodrome one of the most up to date in the country. On Thursday last, Capt. Neville Stack and Mr. J. B. Chaplin left for Lympe in their Vickers-Napier aircraft in order to stand by for a favourable weather report which will enable them to start upon their Australian flight. In this connection, it is worth noting that Mr. Chichester, who put up a meritorious flight to Sydney, was trained by the Brooklands School of Flying.

During the week a Puss Moth, a Bluebird and a Gipsy Moth have been delivered to their purchasers, while a member of the Newcastle Aero Club flew his newly overhauled machine back home, in spite of very bad weather conditions. G-AALT, Capt. Broad's old aerobatic demonstration Moth has now been re-christened and sold to Mr. Dastur, one of the School's Indian pupils.

All the 50 free *Tatler* flying lessons have been given, and the five best pupils will be announced shortly. In addition, four new pupils joined the School during the week.

PHILLIPS & POWIS SCHOOL have had a very good month at Reading, as they put in 41 hr. for the first week, 60 hr. for the second and 30 hr. for the third. For the last week, however, the weather has been exceptionally bad and probably the hours will be found to be somewhat less. The new aerodrome buildings and the Reading Aero Club will officially be opened by Col. and Mrs. Shelmerdine on May 16. The occasion is to be celebrated by a Garden Party, and a cordial invitation is extended to all private owners to attend on that day.

FLYING AT STAG LANE.—Stag Lane, or Eland Strasse, as it is becoming known, has seen a great growth in the London Club recently. Their clubhouse is now more than three times the size of the old club room, and Mr. Ted Benn, the caterer, is prepared to provide lunches for over 50 people at a time.

During the winter of 1930/31 an increase of 50 per cent. over the similar period in the preceding year was recorded in the total number of flying hours, while between August 1930 and March 1931 nearly 50 "A" licences were taken, as against 15 for the same period in the previous year.

The number of members training for "B" licences has greatly increased, and cross-country flying is being particularly encouraged. Increased facilities have enabled members to be given better attention, and there is now room for more pupils. The *Tatler* scheme produced 55 applicants in two days.

MASSED TOURING.—Over 42 aircraft, of which a large number were piloted by amateurs, including two women, left Orly Aerodrome, just outside Paris, on Saturday morning, April 25, for a 3,125 mile tour of France. This tour has been organised by the Union of Federal Pilots of France and the "Journal," with the support of the Aero Club of France and the International Aeronautical Federation, and has been designed to demonstrate the progress which has been made in civil flying and in the perfection of light touring aircraft.

CINQUE PORTS FLYING CLUB.—The Cinque Ports Flying Club was very unfortunate with the weather for the week ending April 25, and consequently only managed to get in 9 hr. 15 min. Twelve pupils have now gone through their preliminary test for the "Tatler" scheme, and on Friday, April 24, Mr. A. V. S. Lange passed the tests for his "A" licence.

During the week the move was completed to the new club premises on the western side of the hangar. These comprise an excellent workshop, a bar, pantry, a large lounge, two dressing rooms and the club office. It is hoped that this better accommodation will attract many local residents, so that they may join the club as ground members, even if they do not wish to fly.

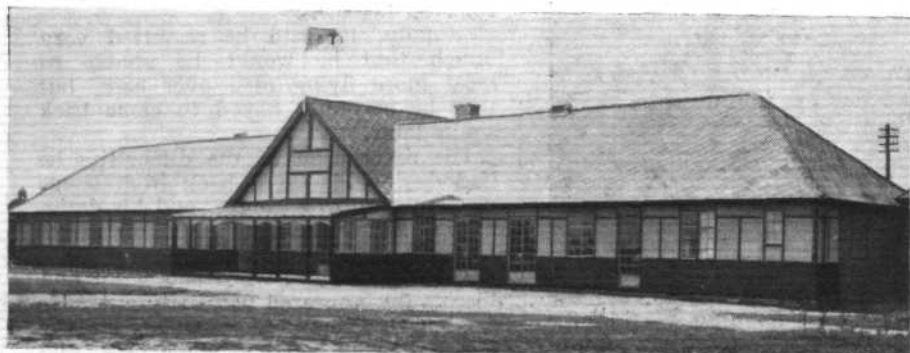
N.F.S. PAGEANTS.—National Flying Services, Ltd., have fixed the following dates for the first of their flying pageants this summer: Nottingham (Tollerton Aerodrome), May 24; Leeds (Sherburn-in-Elmet Aerodrome), May 31; Hull (Hedon Aerodrome), June 7; Reading (Woodley Aerodrome), June 21. At each of these pageants a race for private owners will be organised, for which Cups have been presented. That at Nottingham will be for the Notts, Lincs and Derby Cup; at Leeds for the Yorkshire Cup; at Hull for the East Riding Cup; and at Reading for the Berks, Bucks and Oxon Cup. Those requiring entry forms should write to Capt. G. A. Pennington, National Flying Services, Ltd., London Air Park, Feltham, Middlesex. Among the special attractions for those attending these meetings will be displays by Flt.-Lt. Staniland on a Fairey Firefly, Capt. Blake on a Blackburn Lincock, Capt. Broad on a Moth, Mr. George Murray on a Moth fitted for inverted flying, Flt.-Lt. Armour and many others.

HERTS AND ESSEX AERO CLUB.—A flying club called the Herts and Essex Aero Club has been opened with an aerodrome at Broxbourne, where a spacious clubhouse and some lock-up hangars are already in use. F/O. W. R. Bannister is the club Instructor, while the moving spirits are the brothers Frogley, the well-known dirt track riders.

AERO CLUB OF INDIA.—The annual report of the Aero Club of India and Burma for the last year which has just been published shows that 93 "ab initio" pilots were trained during the year, being an increase of 23 over the number trained during 1929. This, of course, is partly accounted for by the fact that two new clubs were opened. The total hours flown during 1930 compared with 1929 was 7,542, against 3,991 in 1929.

THE HAMPSHIRE AEROPLANE CLUB.—Steady progress is being made by the Hampshire Aeroplane Club. The membership in 1930 increased to 403, of whom 274 are flying members, and the number of hours of flying shows a considerable rise.

The Club is now seeking to extend its activities, and the members are hopeful that before long they will no longer be obliged to confine their interest to the aerodrome at Hamble. Negotiations have been going on between the Club and the Portsmouth Corporation, through the latter's Aerodrome Committee, with reference to the operation of the Portsmouth Municipal Aerodrome at Highgrove.



The new Clubhouse for the Reading Aero Club, erected by the En-tout-cas Co. at Woodley Aerodrome.

Gliding

THE SURREY GLIDING CLUB.—The Annual General Meeting of the Club was held at 17, Stoke Road, Guildford, on April 1, 1931, at 8.30 p.m. Mr. Dagnall was in the Chair, together with twenty-two Members. After the usual formalities, the Secretary presented his Report:—

After the Gliding demonstrations in Stoke Park in March, 1930, a few enthusiasts decided to form the Guildford Gliding Club, within a month the membership had reached approximately forty, and an order was placed with the R.F.D. Company, of this town, for a primary training type Glider.

In the meantime, applications for membership were being received from all parts of Surrey, and it was generally felt that the scope of the Club should include a larger area than was possible if the Club were named "The Guildford Gliding Club." Hence, at a meeting of the Members, the name was changed to "The Surrey Gliding Club," with Headquarters at this address. Also a strong Weybridge Branch was formed under the Presidency of P. Maxwell-Muller, Esq.

His Grace the Duke of Sutherland kindly consented to act as President.

Since then the progress of the Club has been extremely rapid.

Last Autumn two new machines were purchased, a new Dagling and the Prüfling. The original machine, having had upwards of 800 launches, was in need of an overhaul, and, in place of spending money on it, it was decided to sell this and purchase the latest type Dagling.

The Club took part in the Open Competitions held by the B.G.A. at Ditchling last October, and secured all the prizes offered in the classes in which it was able to compete.

The total recorded flying time to date is 3 hrs. 7 mins. 10 4/5 secs.—the Prüfling having 59 flights to its credit and the new Dagling 553 flights. The original machine had 800 launches to its credit.

The Club has obtained twenty "A" certificates, four "B" certificates and one "C" certificate. Total membership numbers 83.

The income showed an excess of expenditure for the year to the extent of £98. The total assets of the Club, both fixed and floating, amounted to £198. These figures, it was felt, were very satisfactory for a new Club. In passing the balance sheet, reference was made to the item of £50 written off for depreciation, and it was explained that it was better to err on the safe side, which accounted for the figure appearing rather large.

THE BRITISH GLIDING ASSOCIATION.—The B.G.A. announces that an American "Sport-light" talkie film on gliding will be shown at the cinemas mentioned below. The scenes include pictures of primary training gliders, with the Instructor explaining the methods used in taking them and manipulating the controls while in flight. There is a chat by the American woman pilot, Ruth Elder, and an exhibition of towed seaplane glider flying by a speed boat.

A Glider and Sailplane Exhibition will be held in the Royal Agricultural Hall from May 6 to May 16, 11 a.m. to 10 p.m. daily.

Each Member of the Association will be entitled to one complimentary ticket to the Motor Show, and Affiliated Clubs 12. Early application should be made by those wishing to attend.

A nominal charge of 6d. is being made to the public to the Exhibition, but on production of their membership cards, Members of the Association will be admitted free, and Members of Affiliated Clubs at half-price.

April 27, Picture House, Southampton.

May 2, Piccadilly Theatre, Manchester; 4, La Scala, Glasgow; 9, Regal Cinema, Manchester; 11, Parade Cinema, Brentwood; Palace Bordersley, Birmingham; Olympia Cinema, Darwen; Regent Cinema, Keighley; 14, Palace, Summerhill, Birmingham; 17, Hippodrome or Princess Cinemas, Blackpool; 18, Savoy Cinema, Leyton, London; Capitol Cinema, St. Helens, Lancs.; Grand Theatre, Hull; Picture House, Cambuslang; Hampden Picture House, Crosshill, Glasgow; 21, Palace Theatre, Hammersmith, W.; Palace Theatre, Wandsworth, S.W.; Palace Cinema, Dunfermline; La Scala, Inverness; 25, Hippodrome, Ilford, E.; Tower Cinema, Leeds; Lorne Cinema, Kinning Park, Glasgow; Ardgowan Cinema, Kinning Park, Glasgow; 28, Cinema or Variety Theatres, Hoxton, E.; Empire or Princess, Barnsley; Queen's Cinema, Stirling, N.B.; 31, Regent or Belle Vue, Weymouth.

June 1, Commodore Cinema, Kirkdale, Liverpool; Popular Cinema, Everton, Liverpool; 4, Coliseum, Walton, Liverpool; Picture House, Greenock; 8, Savoy or Palace, Cleckheaton, Yorks; Queen's Cinema, Watson Street, Glasgow; 11, Gem, Vescock Street, Liverpool; Picture House, Cowdenbeath; 15, Regent Theatre, Birkenhead; Royal Theatre, Rotherham, 18, Pavilion, Dalkeith; 22, Opera House, Lockgelly, N.B.; 25, Palace, Haverfordwest; Electric Cinema, Dumfries; 29, New Coliseum, Paddington, Liverpool; Pavilion, Stanningley, Yorks; King's Cinema, Perth.

July 2, Lyceum, Teignmouth; Lyceum, Bradford; Scala Cinema, Paisley; 6, Don Picture House, Sheffield; Moorpark Cinema, Renfrew; 9, Palace Theatre, Doncaster; 13, Workman's Hall, Ferndale; Picture House, Yeading; Carlton Cinema, Leeds; 16, Royal Cinema, Breck Road, Liverpool; Royalty Cinema, Douglas, I.O.M.; Eureka Cinema, Hull; Kingsway Cinema, Cathcart, Glasgow; 19, Grove Cinema, Stratford; 20, Majestic or Empire, Mexboro'; 23, Workman's Hall, Ogmere Vale; 27, Palace, Chapeltown, Sheffield; 30, Guild Hall, Axminster; Alhambra Cinema, Burnley; Regal Cinema, Burnley; Picture House, Galston, N.B.

August 3, Picture House, Goldthorpe; Cinedrome, Plymouth; 6, Elite, Toller Lane, Bradford; 10, Queen Waterloo, Liverpool; Hippodrome, Bradford; 24, Scala Cinema, Winster Street, Sheffield; 24, Palace, Shettleston, Glasgow; 27, Queen's Cinema, Seacombe, Wallasey, Ches.; Lyric Cinema, Grimsby; Strathclyde Cinema, Bridgeton, Glasgow.

September 3, Pavilion, Barrhead, N.B.; 7, Royal Cinema, Cleethorpes; 14, Savoy Cinema, Huddersfield; Empire, Larkhall, Glasgow; Rialto Cinema, Airdrie; 17, Picture Playhouse, Beverley, Yorks; 21, Lyceum, Leeds; 24, Picture House, Mossbank, Glasgow; 28, Empire, Killamarsh.

October 1, Pioneer Cinema, Dewsbury; 5, Pioneer, Ovenden, Yorks.

THE SAILPLANE CLUB.—The second Club Dance of the Sailplane Club, which was held at the Suffolk Galleries on Saturday, April 25, was again a very great success; indeed, the attendance was considerably more than on the previous occasion.

A new prospectus has been prepared by the club giving details of their gliding and soaring ground, particulars of the club membership, and a handy map which shows the approach to the ground. This can be obtained by those who are interested by writing to the Hon. Sec., E. G. Smettem, 2, Wine Office Court, Fleet Street, E.C.4, and mentioning FLIGHT.

Gliding takes place every fine Sunday, and there is ample accommodation for cars and charming country for those who desire to picnic.



The Dickson Glider of the Dannevirke Glider Club in New Zealand. Mr. L. Willicomb is at the controls.

BOOK REVIEWS

HANDBOOK OF AERONAUTICS*

NEVER before has there been published in this country a book containing between its covers such a wealth of information on aeronautics. It was, we believe, Mr. J. D. North who said once that one of the troubles of the aircraft designer was that he had available a mass of undigested information which it would take a very long time to sort out and correlate. The editors of this book have obviously set out to collect from every possible source such information as is relevant in modern times, and on the whole they have succeeded admirably. If there is any criticism to be made, it is, perhaps, that the data have been somewhat inadequately collated.

"Handbook of Aeronautics" is published under the authority of the Council of the Royal Aeronautical Society, and in a foreword Mr. C. R. Fairey, President of the Society, is careful to point out that, "although the Council cannot accept, as such, any responsibility for the Handbook, they are nevertheless satisfied that every possible effort has been made to produce a work which is definitely authoritative and as accurate as human endeavour can make it. . . ." The General Editor of the Handbook is Squadron Leader Burge, while Captain Pritchard and Lieut.-Col. Lockwood Marsh are Joint Technical Editors. The contributors are all well-known men, specialists in their particular subjects, a fact which inspires one to share Mr. Fairey's confidence in the accuracy of the material published. To check it would be a gigantic task, and the accuracy must perforce be taken on trust.

Captain J. Laurence Pritchard, Secretary of the Royal Aeronautical Society, has quite evidently had a great deal to do with the work of planning and editing the Handbook, and it is no slight on anyone else connected with this publication to express the view that in future the Handbook will certainly become known as "Pritchard's Book," which, among his many efforts, is undoubtedly the book. Pritchard set out to produce an aeronautical equivalent to Dixon Kemp. We are not entirely sure that he has quite succeeded, but he has gone a very long way towards it. As he explains in his Preface, not the least of the difficulties was to know what to leave out. We on FLIGHT can sympathise with that difficulty, for we have to try, 52 times a year, to get a quart into a pint pot. In the Handbook is included little that appears to be superfluous, and, on the other hand, no subject of importance appears to have been omitted, so that one may assume that this particular difficulty has been overcome satisfactorily. The Handbook is definitely *not* a text-book on aeronautical engineering, and presupposes that the reader has studied the subject fairly fully elsewhere. But essential information required in the daily routine work of design is given in fairly accessible form, and thus the Handbook will save reference to hundreds of different publications for the particular information required.

Chapter I deals with materials, and is by Lieut.-Col. Outram, Director of the A.I.D. The material included in this chapter is not new, necessarily so. But it is collected together in convenient form, and is now made available to many junior designers and draughtsmen who may not previously have had access to all or any of it.

In Chapter II, Captain Liptrot, of the Directorate of Supply and Research, deals with Performance. Much of the material included in this chapter will be familiar from Reports and Memoranda, but again the chief merit seems to lie in all essential information being readily available instead of having to be dug out of numerous separate publications. It is a little surprising to find that in this chapter lift and drag coefficients are denoted by K_y and K_x , symbols which might have been thought to belong to the days of Eiffel. The Americans use C_L and C_D , and the Germans C_a and C_w , while modern British practice is to use K_L and K_D . This use of K_y and K_x is all the more surprising as one finds Mr. Relf, in the next chapter, using K_L and K_D . It is, of course, quite immaterial which symbols one uses, provided they are understood, but the use of different ones in the same book may tend to cause some little confusion.

The figures for drag of various bodies given in this chapter all refer to a speed of 60 m.p.h., a curiously inconvenient value which does not convert into an even figure for speeds in ft./sec., and which is not in itself a very convenient figure to work with. It is probable that the

very free use made of Reports and Memoranda is responsible.

The section of this chapter which deals with wing data reveals how British practice adheres to the time-honoured idea of Aspect Ratio, "Mean Chord," etc., and how little headway have made such conceptions as induced drag, profile drag and span loading. The author of Chapter II is scarcely to blame for that. The average British designer is familiar with the older expressions, and prefers the complication of the old familiar way to the handier, but as yet slightly unfamiliar, "furrin" methods.

Mr. Relf, Superintendent of the Aerodynamics Department of the National Physical Laboratory, is responsible for Chapter III, which deals with Aerodynamics, and his introduction is almost the only part of the Handbook which is in the slightest "text booky." This is not meant as a criticism. On the contrary, the brief explanation of the main principles of the laws of aerodynamics is very welcome. For the rest, Chapter III contains data of a number of wings (the curves being plotted in the good old way, lift coefficient, drag coefficient and lift over drag, against angle of incidence; the polar diagram is excluded from such august company), data of a number of strut sections, figures of drag of wheels, undercarriage etc., and a large section on stability and control.

Under the heading "Design and Construction" (Chapter IV), Captain Pritchard deals with strength calculations and kindred subjects, and much of the material will be familiar either from A.P. 970 or from Pippard and Pritchard's book. This chapter contains a wealth of information and data, but it is rather regrettable that the subject of flying-boat hulls is dismissed with a paragraph of under 20 lines. Certainly, in the next edition, it is essential that someone with specialised knowledge should contribute a substantial section on this subject.

Coming as it does from such an acknowledged authority on the subject as Mr. H. C. Watts, the chapter (V) on Airscrews is accepted without question. The only criticism one has to offer is that it is a very short chapter, and might with advantage be extended in the next edition.

Perhaps the most remarkable chapter in the book is Chapter VI, on Engines, by Mr. Roy Fedden, the designer of the famous Bristol aero engines. Not only has Mr. Fedden collected data of scores of aero engines from all over the world, but he gives data of materials and how and where they are used, which have certainly not been generally accessible before.

The rest of the Handbook is devoted to subjects not quite so intimately connected with the work of the aircraft designer, but of great interest and importance nevertheless. Mr. Kemp and Squadron Leader Burchall deal, in Chapter VII, with Air Survey and Photography, Mr. Stewart with Aircraft Instruments (Chapter VIII), Major Stewart with Wireless Apparatus (Chapter IX), and in Chapter X Captain Entwistle deals with Meteorology. Finally, the Handbook concludes with a chapter (XI) on Airship Design by Roxbee Cox and Collins.

Altogether "Handbook of Aeronautics" is a publication which should find its way, in many copies, into every aircraft firm in the country, while general readers who have studied the subject of aircraft engineering in a general way will find the book highly informative.

*Published under the authority of the Council of the Royal Aeronautical Society by Gale & Polden, Ltd. Price 23s. net. Obtainable from FLIGHT Office.

ANOTHER WAR HISTORY

MR. SNOWDEN GAMBLE has set an ambitious task before himself. To find the beginnings of the history of military aeronautics in the year 1783 is somewhat startling to the reader. The first chapter explains that the author traces British military aeronautics back to the Montgolfier hot air balloons, which were neither British nor military, but still were the ancestors of all military aeronautics. In fact, the early part of the book is mainly concerned with balloons, and the opinions of various past authorities as to whether they would or would not be of any use to the Army. This is all very painstaking on the author's part, but its value, even for reference, is problematical. Then we get on the airships, and the story of the "Mayfly" and the "Nulli Secundus" is told once again. And then come aeroplanes. There again the early

history has been told well not a few times before. The official "War in the Air" has dealt very adequately with the history and development of early airships and aeroplanes. This volume, however, is smaller in size and cheaper in price than the official history, and, being very complete, it may be recommended to readers who want a full record but do not care to pay for the official history.

This book will be justified by its second volume rather than by its first. The volume under review now is in the nature of an introduction, and therefore one can hardly express a considered opinion about Mr. Snowden Gamble's achievement. We look forward to the appearance of the next volume which will take us into the war period, and then we shall be able to judge whether this is a really valuable book or not.

"The Air Weapon." Being some Account of the Growth of British Military Aeronautics from the Beginnings in the year 1783 until the end of the year 1929. Vol. I. Nov. 1783—Aug. 1914. By C. F. Snowden Gamble (Oxford University Press). Obtainable from FLIGHT Office. 12s. 6d. net.

REAL EXCITEMENT

"MISSING" is the title of an exceptionally interesting and thrilling book written by Flt.-Lt. T. B. Bruce. In this book Flt.-Lt. Bruce records his adventures during the thirteen weeks when he was in Belgian territory occupied by the Germans during the war. It is a little unfortunate, perhaps, that he is so diffident and that he lets his natural modesty overcome his descriptive powers, because in so many places the reader will feel like telling him that, had he talked a little more about himself, he could have made the book so much more interesting. Even as it is, however, few readers will want to put it down before it is finished, and certainly the naturalness of his style and the unaffected way in which he tells his simple story make it delightful to read.

It all started when his flight of four machines, which was on patrol, landed behind the lines in order to find out where they were. Two whose engines had kept running were soon away again, as also was one whose engine had stopped, but was started up again immediately, but Flt. Lt. Bruce's machine refused to start, and, although he enlisted the help of the peasantry to swing his propeller for him, their efforts were fruitless, and finally he burnt the machine and escaped with one of their number. Fortune certainly seems to have favoured him on many occasions, but the courage which he displayed when moving about in the towns amongst the German soldiers while disguised as a Belgian peasant must have been of the very highest. Recognition of this fact was shown by H.M. the King, who sent for Mr. Bruce on his return in order to hear the story first hand.

"DAEDALUS."

"Missing." By Flt. Lt. T. B. Bruce (W. Blackwood & Sons, Ltd.). Obtained from FLIGHT Offices. Price 5s. net.

CANADA'S FIGHTING AIRMEN

UNLESS a writer has been himself a fighting pilot, it must be a very difficult task to write an account of a fighting pilot's career. We have no information as to the part played in the War by Lieut.-Col. Drew, but we imagine from internal evidence that he was not himself a pilot. Yet he has undertaken the task of writing accounts of the fighting career of 12 distinguished Canadian pilots. Such a book, if written by one who himself knew all the points of fighting in the air, ought to be really fascinating. What was it, the layman would like to know, which made Bishop the second most successful air fighter on the Allies' side and third only to Richthofen and Fonck among the pilots of all the warring nations? Col. Drew says that he was a very good shot, and he says the same about several others of his heroes. We quite admit the importance of marksmanship to a fighter pilot, but we are quite sure that it does not tell the whole story. Pilots who have written books, Bert Hall, for example, tell us that each successful fighter developed his own peculiar technique. Richthofen, we know, owed a great many of his victories in the earlier part of his career to the superior performance of the Albatros over that of any contemporary Allied fighter aeroplane. To this he added great skill in holding the position over the tail of his adversary and also excellent marksmanship. Some fighters trusted to one rapid dive and burst of fire, and pulled out of the fight if that did not succeed. Mannoek, who was considered by those who knew him, the most deadly fighter of all, was a man who could and would take a young pilot out with him, and so manoeuvre that the novice bagged

the Hun. That indicates a special style of fighting. If Col. Drew could have told us something about the individual fighting styles of Bishop and Barker and the other great Canadian fighters, his book would have been one of the greatest interest and value.

This author, however, has no power of analysing the secrets which made for the success of his heroes. He knows that they were all brave, and that some of them were good shots, but he does not seem to know much more. In fact, he says that there was no secret about the success of these Canadians beyond good marksmanship and a consciousness of their own superiority. What we would like to know is the grounds they had for that consciousness of superiority. One does not become a superior pilot just by feeling that one is one. Without an intelligible explanation of this all-important point, a book like this becomes an almost tedious repetition of "The young Canadian aligned his sights on the leading German and shot him down in flames." That sentence is not quoted from any one page of the book, but the book is largely composed of that sentence in slightly varying forms.

There are a few passages in the book which appear to reflect the indignation which was often expressed at the time that the British made less of the feats of their air fighters than was the custom among the other combatant nations. The official British point of view was that to make very much of the exploits of the fighters was to do an injustice to the pilots and observers of the reconnaissance aeroplanes, who had to do equally risky and even more important work with far less chance of winning distinctions. The men who went out day after day in R.E.8's to spot for artillery or to photograph the German lines with the full knowledge that the "Albatros" or the Fokker was sure to take a heavy toll of them, were certainly heroes not inferior in calibre to Richthofen who slew so many of them, or even to Bishop or Barker. A hero is a hero, whether the results of his work are spectacular or not and we should guard against unjust discrimination. The fighters were most heroic when they had to fly aircraft with a performance inferior to that of the German machines. Perhaps Barker would not have won the Victoria Cross if he had not been flying a "Snipe" in his final Homeric combat. Yet he would have been no less heroic if he had been flying an older type and had been killed out of hand.

In many ways, however, this book is interesting. It has put on record the doings of 12 great fighter pilots, and so it well deserves a place in any library which deals with the war in the air.

Canada's Fighting Airmen. By Lieut.-Colonel George A. Drew (Maclean Publishing Co., Ltd., Toronto). Obtainable from FLIGHT Offices, price 23s. 3d. post free.

F. A. DE V. R.

ON ATLANTIC FLIGHTS

MR. DIXON is not only an attractive writer; he is becoming a prolific one. He has produced two useful books about parachutes, and a more trifling one about Miss Amy Johnson. Now comes his fourth book. Very prolific writers need to guard against the danger of choosing subjects which are not quite worthy of their industry and their ability. A record of the various flights across the Atlantic by aeroplane and by airship is a subject which seems to us hardly worthy of Mr. Dixon's mettle. Because the Atlantic has been crossed a few times we cannot admit that it has been conquered. Therefore, the title of this book is hardly justified. That ocean will have been conquered when aircraft have established their power to cross it with regularity and safety, and that has not yet been accomplished. Mr. Dixon prophesies that within another 10 years there will be regular weekly air services between Europe and America, carrying mails and other light special freight. Prophecies of what will happen in the air 10 years hence are fairly safe, in that few will venture to contradict them. All we can say at the moment is that the technical indications are that if such a service does come to pass, it will probably run serious risks in the way of lack of reserve engine power and in high landing speed, and that the charge for the special freight will almost certainly be so high as to be almost prohibitive. Whatever we may feel 10 years hence, at the moment we are much more interested in seeing air services established over routes which promise easier operation and better commercial prospects. But, of course, the airships may still make good, and that would alter the whole Atlantic position.

The Conquest of the Atlantic by Air. By Charles Dixon (Samson, Low, Marston and Co., Ltd.). Obtainable from FLIGHT Office. Price 6s. net.

Air Transport

THE AIRWAYS OF ASIA

Air transport in Asia is making rapid strides. We think few realise that there are already a number of air routes in operation, linking up many important cities of the East, and the accompanying map of existing and projected air routes will show how the air network is growing. In the following article we have endeavoured to give an accurate account of the airways of Asia, but in some cases it is difficult to obtain detailed information regarding certain air routes, while developments are still taking place and may have happened since we wrote these notes.

IN no other part of the world, perhaps, does air transport offer such great possibilities in improving communications between various countries and in developing commerce as in Asia. At present ordinary methods of transport in certain parts of Asia are by no means rapid, and communication between some of the Eastern countries, and even to and from Europe, are difficult and tedious.

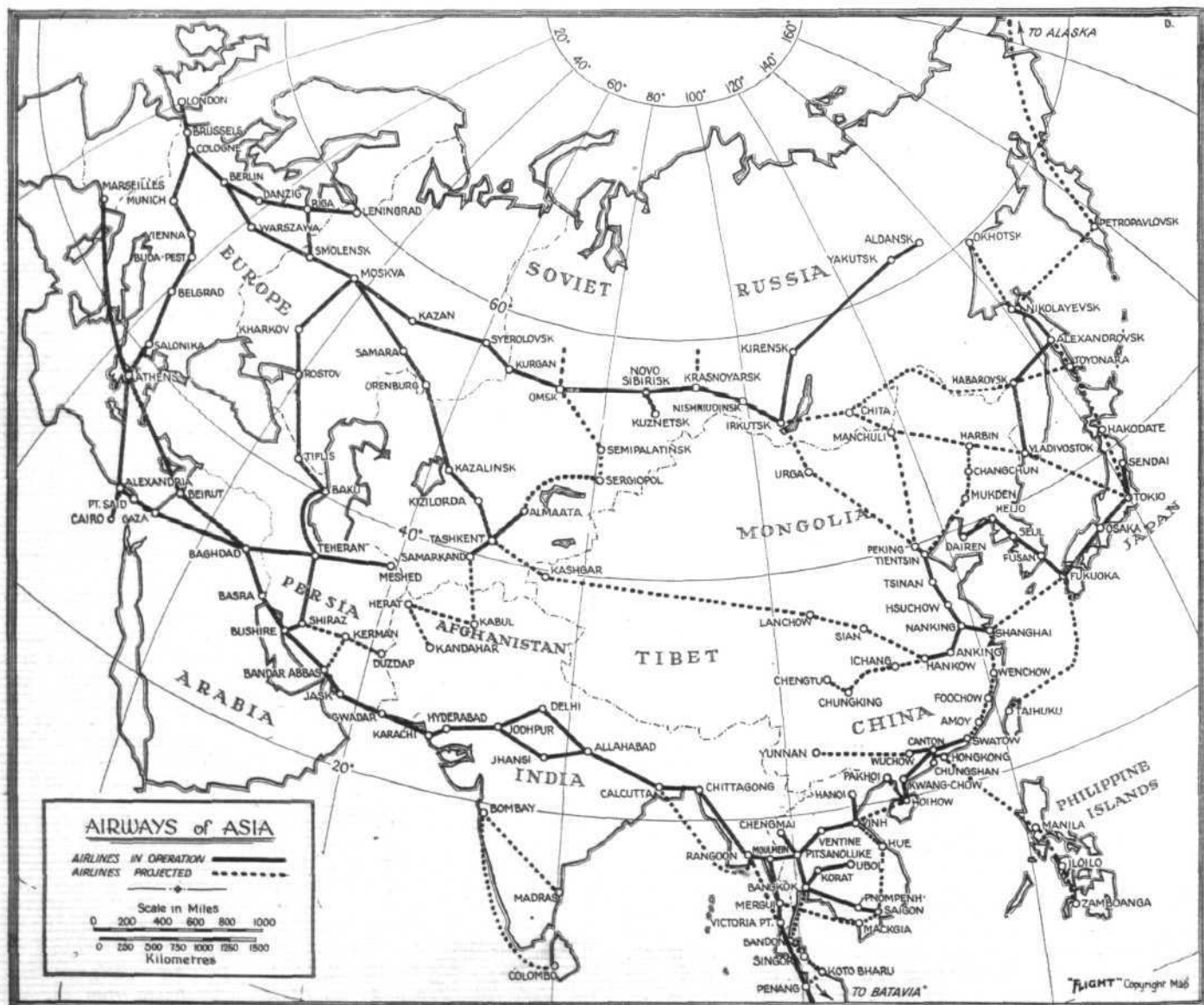
Air transport, however, over the vast distances encountered there can overcome the obstacles faced by the railway and the caravan economically, and, of course, with considerable gain in the matter of time occupied for the journey.

The Orient has—in some cases, after a period of waiting and watching—taken an active interest in the aeroplane without waiting for the European or American to come on the scene. Such countries as Japan, China and Siam are preparing—and have, in fact, already started—for an extensive development of air transport in their respective countries.

As regards air routes from Europe to Asia, we have our own Imperial Airways service to Cairo, Baghdad and thence to India, with a regular extension—we hope soon—to Australia via Burma, Siam and Java. India itself offers opportunities for internal air services, linking up with the main Empire routes, and some day, perhaps, the Government will take the necessary action to get these established. They have, at any rate, ordered some machines.

Then there is the Dutch service of K.L.M. from Amsterdam to the Dutch East Indies, which more or less follows the same route as the Imperial Airways to India. We have already given details of this service, and the K.N.I.L.M. services in the Indies, in FLIGHT for Jan. 9 and 16 last, so it will be unnecessary to refer to them again here. It may be remarked in passing, however, that the question of extending the Dutch service to Australia has seriously been considered, and an experimental service was due to start on April 30.

France also has a service to the East, whereby she



establishes communication with her colony Indo-China. This service, which is operated by the Air Orient Company, runs from Marseilles to Saigon via Athens, Beirut, Baghdad, Karachi, across India to Calcutta and Bangkok. There are also developments in progress in Indo-China itself, of which more anon.

Germany and Soviet Russia also have air roads to the East, the former, in conjunction with Luft Hansa, and the German-Russian lines, into Persia via Moscow, Kharkov, Tiflis and Baku, and the latter with lines extending across Siberia towards China, and also towards Afghanistan and Tibet. As previously reported in FLIGHT, the German Luft Hansa Company is interested in the air route from Berlin to Shanghai, and it may not be long before this service starts operations, and four Junkers machines (two F.13's and two W.33's), pilots, mechanics, etc., have been sent out to Shanghai to start the section from Shanghai to the Russo-Chinese frontier.

Here we might deal with the activities of Soviet Russia in Asia. The principal companies operating in the Soviet Union are the Russo-German Deruluft, and the Dobiolet Company of Moscow, which recently merged with the Ukrainian company, Ukwozdukhput.

Branching from Moscow, which connects with Berlin, Riga and Leningrad, there is the line previously referred to running to Persia; another serves Kazan, Sverolovsk, Kurgan, Omsk, Novo Sibirsk, Krasnoyarsk, Nishniudinsk and Irkutsk, with branch lines from Novo Sibirsk to Kuznitsk and from Irkutsk to Aldansk, North-East Siberia, on the way to Alaska.

Here it may be mentioned that the United States of America has been considering plans for linking up with Europe by way of Canada, Alaska and Siberia, and with the Orient, across the Behring Strait. The U.S. postal authorities have already made preliminary investigations and submitted a favourable report.

Another line from Moscow, by way of Samara, Orenburg, Kazalinsk, Kizilorda and Tashkent, with branches from Tashkent to Almaata—later linking up with Omsk and Samarkand, with probable extension into Afghanistan and across Tibet to China. Russia is also considering lines northwards towards the Arctic. The machines used on these various lines are Junkers and Soviet-built machines of the "A.N.T." and "K5" type. Further extensive aerial activity is being planned by Russia for the near future.

Air services in Palestine and Iraq are at present confined to the British, French and Dutch services passing through, but local services are not unlikely in the future. Persia, however, has its own services, operated by Junkers Flugverkehr. Besides the route from Europe via Baku, lines run from Teheran to Meshed, Shuaz and Bushire, the latter linking with Imperial Airways, while it is proposed to extend services to Kerman, Duzdap, and Bandar Abbas.

Afghanistan is at present without airways, but willing—if not anxious—to try the experiment. Ex-King Amanullah was keenly alive to the possibilities of aviation, and was, we believe, about to open up air routes in his country, and drew up an agreement with the German Junkers firm for air services between Kabul, Herat and Kandahar.

We will now turn to China, where air transport is making good progress, thanks mainly to the energies of Marshal Chang Hsueh-liang, who owns and flies his own Gipsy Moth, and China's Minister of Communications, Mr. Wang Pe-chun. The former has been building up an efficient Manchurian air force, which includes amongst its "rolling stock" a fleet of Gipsy Moths, while the latter is extending air mail services as rapidly as political circumstances will allow.

Poor roads and absence of railways in North, Central and South China are speeding up the establishment of airways, and many new routes are being opened up south of the Great Wall. Perhaps the most important of China's air routes is one which follows the Yangtze river, operated with Keystone-Loening Amphibians by the China National

Aviation Corporation, a joint Chinese-American concern. These machines fly regularly between Shanghai, Nanking and Hankow, making the journey in a little over six hours.

A service has also been opened between Nanking and Peking, whence the route to Berlin will be opened as soon as final arrangements have been completed. Other extensions of this system will be from Hankow to Ichang, Cungking and Chengtu, from Tientsin and Peking to various parts of Manchuria, serving such places as Mukden, Harbin, Dairen (linking up with Japan) etc., and southwards from Shanghai to Canton, via Foochow and Amoy.

As regards South China, where conditions are somewhat unsettled, the Canton Aviation Bureau recently inaugurated a service linking Canton with Wuchow, Swatow, Hoihow and Pakhoi. Hongkong is also "in the flying," thanks to the activities of the Far East Aviation Co.—of which Mr. R. Vaughan Fowler is managing director—and the help of the Hongkong Government. In addition to a flying school, Hongkong is—or will be—linked with Canton by an air mail service.

Going still farther south, we come to Indo China. At first aerial activity here was confined to military operations, but recently commercial flying was developed, and a service organised between Ventine and Vinh, with an extension to Hanoi and later to Saigon. The latter place is also connected, through Bangkok, with the service from France.

Siam, adjoining, also has its air services, but details of these are lacking, although one understands that Bangkok, Korat and Ubol are linked together by air.

With the establishment of the Europe-Australian air services and other Far East routes, it is expected that developments will be forthcoming in Malaya—a service between Singapore and Penang has already been planned—and the Philippines. The Philippine Aerial Taxi Company was recently formed in Manila, and machines ordered by them, but whether they have started operations we have yet to learn. Apparently, a service is planned between Zamboanga and Manila—and probably across the South China Sea to Hongkong.

We have already dealt with, in a previous issue of FLIGHT, the air services operating in the Dutch East Indies, and it now only remains for us to refer to the air lines of Japan. The Land of the Rising Sun has made rapid strides in commercial aviation of late. For a long time Japan has made big efforts to build up an aeroplane industry of her own—and with some success. At first she concentrated on military and naval aeronautics, but recently the Government has turned its attention to commercial aviation, and it will not be long before Japan will probably rank foremost amongst the Eastern nations in this respect.

Extensive government aid is being given to commercial aeronautics in Japan, and during the next 11 years the government contemplates subsidising the aircraft industry to the extent of about \$10,000,000 (gold). Wireless beacon stations have been erected at Tokio, Hakone, Nara, Osaka, and Fukuoka, while route marks have been placed at eight places between Tokio and Fukuoka, and five meteorological stations have been laid down.

There are at present 42 civil airports and landing fields in Japan, and a new airport has been laid down for Tokio, at Haneda on Tokio Bay, less than half an hour from the heart of the city—much more conveniently situated than the old aerodrome at Tachikawa. The Japanese Air Transport Company, the principal operator of air services in Japan, runs regular services between Tokio, Osaka, Fukuoka and Dairen in Korea, and between Tokio and Sendai. It is hoped to extend the services with lines between Fukuoka and Shanghai and Fukuoka and Taihuku in Formosa. Japan also proposes to link up with Soviet air lines in the north—i.e., Vladivostock, Alexandrovsk, etc.

At first the Japanese Air Transport Co. employed Japanese-built machines on its services, but recently changed over to Fokker Super-Universal F-7-SM's.

CIVIL AVIATION PROGRESS IN CANADA

CIVIL Aviation Branch of the Dominion Department of National Defence reports a steady increase in commercial flying last year, there having been a total of 135 operating concerns, or 50 more than in 1929. The total number of hours flown was 87,453, an increase of 7,667 during the twelve months.

Returns from the nineteen principal commercial operators and three mining companies and the Ontario Provincial Air

Force indicate a total of 52,621 hours flown by those concerns, a mileage of 4,350,970 covered, and 55,961 passengers and 1,449,337 lb. of freight carried. Three additional air mail routes were established in Canada during 1930, bringing the total to nineteen, and these were operated by seven companies under contract with the Post Office Department. The total length of Canadian air mail routes in 1930 was approximately 6,487 miles, of which 1,200 miles are now lighted for night

flying. In 1929, the air mail routes measured 5,139 miles. Weight of mail carried amounted to 447,088 lb., as compared with 430,636 lb. in 1929.

The machines of the Canadian Airways, Ltd., the new Canadian commercial air service in which the Canadian National and Canadian Pacific Railways are jointly interested, have a flying record of over 2,500,000 miles. Their field of operation extends from Ontario to the Pacific Coast and from the international boundary to points north of the Arctic Circle, one having visited the Magnetic Pole this year. They have transported 40,000 passengers and large quantities of mail, freight and express goods.

Forest fire patrols, air photography, air mail investigations, etc., are important operations carried out by the Directorate of Civil Government Air Operations, and in connection with these activities approximately 13,546 flying hours were spent last year. Other information furnished indicates that at the end of 1930 private pilots in Canada numbered 309 and commercial pilots 402, and there were 370 air engineers, 495 aircraft, and 69 air harbours.

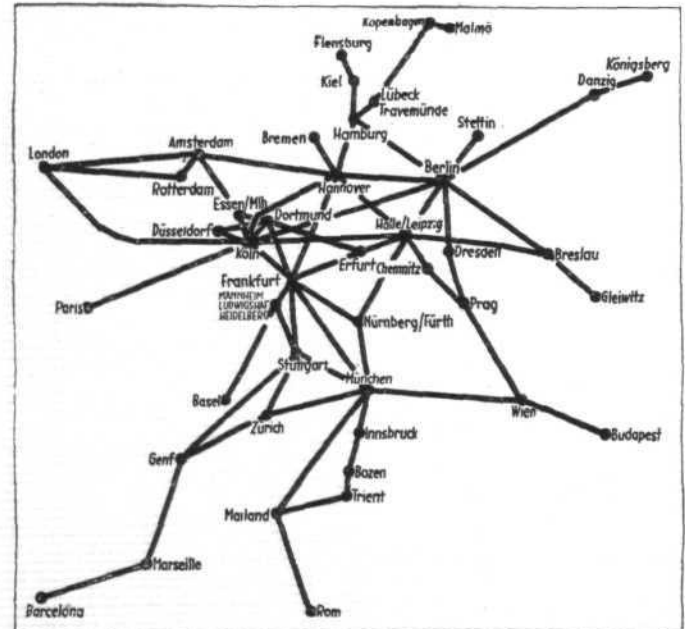
Air Mail Traffic

DURING the quarter ended March 31, 1931, 22,137 lbs. of letter air mail were carried from this country, as compared with 17,577 during the corresponding quarter of 1930, an increase of 26 per cent. The carryings to India were again larger than those to any other country, viz., 8,470 lbs., as compared with 6,740 in the March quarter of 1930, an increase of 26 per cent.

The traffic to various destinations was as follows:—

	March Quarter, 1930. lb.	March Quarter, 1931. lb.
Indian Air Service (including Egypt, Iraq, Palestine, &c.)	9,460	12,453
Iraq (air from Gaza)	1,468	No service
Australian Internal Service	993	903
South African Internal Service	934	2,225
Central African Service	—	388
Other Extra-European Destinations	1,121	1,576
Total Extra-European Services	13,976	17,545
Continental Air Services	3,601	4,592
Grand Total	17,577	22,137

The development of the Imperial Air Services was satisfactory, and the proportion of mail for Empire destinations amounted to more than one-half of the total mail carried during the March quarter. The traffic for European countries continues to grow, and showed an increase of 27 per cent. as compared with the March quarter of 1930. There was a slight decrease in the amount of parcels carried by air to European destinations, the figures being 26,199 lbs. in the March quarter, 1931, as against 29,636 in the corresponding quarter of 1930.



THE LUFT HANSA AIR NET: In our issue for April 10 we gave particulars of the Luft Hansa Summer Air Services. Above is a diagram showing the various routes in question.

Early in February this year, a fast air mail service was inaugurated between Eastern Canada and the Prairie Provinces, mail despatched from Montreal reaching Calgary in two days. The new service is being carried out in co-operation with the United States postal authorities, mail matter being transferred to the United States air service at Detroit (Michigan), and again delivered to Canadian aeroplanes at Pembina, North Dakota, for transportation to Winnipeg.

Statistics relating to the Canadian manufacture and import of aircraft during the first nine months of 1930 indicate that Canadian firms are now well able to supply the Dominion's rapidly growing demand for aircraft and equipment. At the present time eight companies are engaged in aircraft construction, and during the first nine months of last year new aircraft manufactured totalled 69, valued at £1,098,086. Manufacture of equipment by other firms brought the total output value to £2,048,673, against which imports of aircraft and equipment were valued at only £433,700, so that Canadian firms supplied over 80 per cent. of the Dominion's aviation requirements during the first nine months of 1930.

Air Mails: News Times of Posting

THE Postmaster-General announces that the latest times of posting at the G.P.O., London, for air mail correspondence for France, Germany and South America (via France) will be altered as follows:—France: 10.30 a.m. instead of 11.0 a.m. (weekdays). Germany: Night air mail service. Letters, 8.0 p.m. instead of 7.0 p.m.; parcels, 6.30 p.m. instead of 5.30 p.m. South America (via France): 10.30 a.m. instead of 11.0 a.m. (Saturdays).

Germany Obtains African Air Mail Contract

GEN. HERTZOG, Union Prime Minister, announced on April 17 that the contract for the air mail between the Union of South Africa and South-West Africa had been awarded to the Junkers Co. Union Airways, Ltd., was the only other firm to submit a tender.

A Moscow-Siberia Air Service

A PASSENGER service, with 10-seater machines, operating every other day, has been established between Moscow and Novosibirsk, the capital of Western Siberia.

Deruluft Spring Services

As a result of the late spring, the Deruluft Company has been compelled to postpone for a few days the opening of the service to the Baltic States and U.S.S.R. It had originally been intended to begin the services on May 1, but it is now hoped to open the services from Berlin via Koenigsberg and Kaunas to Moscow, and from Koenigsberg via Tilsit, Riga and Tallin to Leningrad on May 5 instead, subject to the weather conditions improving sufficiently.

Paris-Constantinople Service

On April 20 the first air service between Paris and Constantinople—a distance of 1,899 miles—was inaugurated, when a machine left Constantinople at 3 a.m. and arrived at Le Bourget at 9.50 p.m.

The Australian Air Mails

THE first air mails from England to Australia, which left Croydon on April 4, have reached Australia. It will be remembered that the Imperial Airways D.H. "Hercules" crashed on the last stage of its journey to Port Darwin on April 19, and Air Commodore Kingsford Smith left Sydney two days later in the *Southern Cross* to pick up and convey the stranded mails to Darwin. He arrived at Darwin on April 23, and Kupang April 24, and after taking on the mails returned to Darwin next day. Here he handed over the mails to a Q.A.N.T.A.S. machine, which left Darwin for the south on April 27, arriving at Brisbane on April 28. Meanwhile an A.N.A. aeroplane, *Southern Star*, left Melbourne on April 23 with the first mails from Australia for Sydney, whence they were taken on to Brisbane in the *Southern Sun* on April 24. On arrival at Darwin, per Q.A.N.T.A.S., Air Commodore Kingsford Smith again took charge, and left for Kupang on April 27, en route for Akyab, where the mails will be handed over to Imperial Airways, on or about May 3. The second outward mails to Australia left Croydon on April 25, and on arrival at Akyab will be handed over to Air Commodore Kingsford Smith, who will take them on to Darwin, where they are due on May 10. The K.L.M. Holland-Dutch East Indies air mail, which left Amsterdam on April 29, is to be extended from Batavia to Melbourne. The times of transmission are expected to be: To Brisbane, 17 days; to Sydney, 18 days; to Melbourne, 19 days.

DEATH OF AIR VICE-MARSHAL F. V. HOLT

THE Air Ministry deeply regrets to announce that Air Vice-Marshal Felton Vesey Holt, C.M.G., D.S.O. (Air Officer Commanding, Fighting Area, Air Defence of Great Britain), and Flight-Lieutenant Henry Michael Moody, M.C., lost their lives as the result of a collision which occurred at Seahurst Park, Sussex, on April 23, 1931, between a Moth aircraft of No. 24 (Communication) Squadron, Northolt, Middlesex, and a Siskin aircraft of No. 43 (Fighter) Squadron, Tangmere, Sussex. Flight-Lieutenant Moody was the pilot of the Moth aircraft, with Air Vice-Marshal Holt as passenger. No. 365094, Sergeant Charles George Wareham, the pilot and sole occupant of the Siskin aircraft, was not injured.

Air Vice-Marshal F. V. Holt was the third son of the late Sir Vesey Holt, of Holt & Co., the Army bankers. He was born in 1886, and was educated at Eton. He was seconded in April, 1913, to the Royal Flying Corps from the Oxfordshire and Buckinghamshire Light Infantry. He served with the Royal Flying Corps and the Royal Air Force in France during the war, and in addition to being awarded the C.M.G. and D.S.O., was on a number of occasions mentioned in despatches.

During 1920-22 he was seconded for special duty with the Chinese Government, and later commanded the Central Flying School, Royal Air Force. After promotion to the rank of Air Commodore in July, 1925, he was posted to Headquarters, Air Defence of Great Britain, for air staff duties, and in December, 1928, was appointed Director of Technical Development at the Air Ministry. He was promoted to the rank of Air Vice-Marshal in January of

the present year, and was appointed Air Officer Commanding, Fighting Area, Air Defence of Great Britain, on April 1 of the present year. He leaves a widow and two children.

It appears from the evidence given at the inquest on Saturday, April 25, that the Air Vice-Marshal, accompanied by Flight-Lieut. E. H. Bellairs, his personal assistant, and Flight-Lieut. Moody, flew to Tangmere station in two Moths. On leaving the aerodrome, Bellairs took off first, and waited for the second Moth with the Air Vice-Marshal and Flight-Lieut. Moody. At the time No. 43 (Fighter) Squadron was still in the air, preparing to land after the inspection. No. 1 (F.) Squadron had already landed. On catching sight of one Moth, Squadron Leader Slatter thought it was that of the Air Vice-Marshal, and signalled for the squadron to dive in a normal salute. Actually the Moth which he saw was that of Bellairs. The other was not seen by the squadron. The squadron dived some 300 to 500 feet in formation, when the pilot on the left, Sergeant C. G. Wareham, who was quite rightly watching his flight commander, with his eyes turned to the right, felt his left wing tip touch something. It had just hit the other Moth, which went into a spin. Moody corrected the spin, but a dive followed, as usual, and the machine was then too near the ground to recover. Air Vice-Marshal Holt attempted a parachute drop, but was too near the ground. Medical evidence was given that he and Moody must have been killed instantly. Sergt. Wareham was able to fly back, and landed on Tangmere aerodrome. The jury returned a verdict of accidental death, and added that no blame attached to anyone in the squadron.



THE AIR LEAGUE ANNUAL DINNER

THE Air League held their fourth Annual Dinner at the new and palatial Dorchester Hotel in Park Lane on Wednesday, April 22. Some 200 persons were present, and CAPT. THE HON. F. E. GUEST was in the chair. He expressed regret that the membership of the League was only 6,000, and said that, in order to make Britain air-minded, they must not be satisfied with such a small number. In general, he voiced a plea for larger assistance from the Government.

The RT. HON. LORD STONEHAVEN OF URY, in proposing the toast of British Aviation and the Air League of the British Empire, laid stress on the personal touch as the thing upon which the relationships of the Empire depended. Aerial travel, he said, would eliminate distance, and thereby enable this personal touch better to be maintained.

The RT. HON. LORD AMULREE OF STRATHBRAAN (Secretary of State for Air), in responding, voiced the usual sentiments of Secretaries of State when he said that civil aviation would have to take its chance with the rest as far as Government monetary assistance was concerned. He stressed the need for slow and steady growth, and quoted the Aeropostale Company, with its air mail line to South America, as a regrettable outcome of showy window dress-

ing coupled with very short-sighted policy. He referred briefly to the research which was being carried out by the Air Ministry on matters such as "noise" and "the safety of aircraft," and also to the beneficial work of aviation in promoting international understanding in securing the unity of the Empire as a whole.

LT.-COMM. DR. THE HON. J. M. KENWORTHY, R.N., who replied for the Air League, quoted a mass of figures to show that the Air League was a long way behind similar Leagues in other countries in the matter of membership, and he spoke of the need of rousing the interest of the youth of the country, particularly by fostering interest in flying and gliding clubs.

LT.-COL. F. C. SHELMEKDINE (Director of Civil Aviation) proposed the toast of the light aeroplane clubs, and again quoted figures showing their growth and history.

The RT. HON. EARL OF HALSBURY replied, and mostly tilted at British designers, whom, he said, did nothing but produce super-sports models, when a utility machine which he could land in the back garden and take to visit his relations was what he required.

COL. THE MASTER OF SEMPILL, with one of his usual well-chosen speeches, proposed the health of the Chairman.



Aviation in Turkey

ACCORDING to the Constantinople correspondent of the *Manchester Guardian*, there is probably no other Air Force in the world which has been built up by voluntary national effort like the Turkish Air Force. The creation of this force has not been the work of the Government, but of the Air League influencing the population to take an active interest in aviation and organising subscriptions, lotteries, fêtes, regattas, dances, rosette days, and other forms of lucrative entertainment. The Government spends a third of the national Budget on its armed forces, but this does not suffice to keep up with the necessities of aviation. The Air League has, however, made up the deficiency, and has in four or five years been able to purchase for the Government one hundred and fifty aeroplanes. A very consider-

able part of the money collected by the League comes from the aviation lotteries. The Turk is an inveterate gambler, and, in the towns at any rate, few Turkish men or women omit to buy the monthly air lottery ticket, giving prizes up to £5,000. The consequence is that in the past two years alone the League's annual average takings from this source have been over £175,000. The total revenue of the League since its foundation only a few years ago has been over £3,300,000. In order to keep up the interest in the Air Force, the mosques are now illuminated at Ramazan, the Moslem fast, with appeals for subscriptions outlined in fairy lamps, instead of with texts from the Koran as used to be the case. The Air Force so built up did invaluable work recently in the attack on the Kurdish rebels' repairs on Ararat.

Airisms from the Four Winds

The Schneider Contest

WITH regard to French preparations for the Schneider Contest, *Les Ailes* states that speeds of 400 m.p.h. and engines of 2,300 h.p. are aimed at. The firms of Nieuport-Delage, Bernard, and Dewoitine are building the seaplanes, and the engines are being produced by the Renault and Lorraine firms. The machines will be low-wing monoplanes. The Lorraine engine, designed by M. Barbarou, is supercharged, the blower turning at 28,000 r.p.m. The engine is said to develop 2,200 h.p. at 4,000 r.p.m. The Renault engine is said to develop 2,300 h.p. and to weigh only 1,540 lb. The former is a 12-cylinder inverted V, and is called the "Radium." Its cross section is not much greater than that of the pilot's body. The Renault is a normal water-cooled V. The training at Berre is being carried out on F.B.A. and Nieuport 62 seaplanes. The actual racers are being tested by civilian pilots, including M. Sadi Lecointe, before they are handed over to the Schneider team.

No. 203 (F.B.) Squadron

Two of the three "Rangoon" flying boats (three Jupiters) of No. 203 (F.B.) Squadron arrived at Basra on April 21. The third boat is waiting at Baghdad until Group Captain W. L. Welsh, D.S.O., A.F.C., is ready to proceed to his squadron's station.

No. 209 (F.B.) Squadron

THE two "Iris" flying boats (Three Condors) of No. 209 (F.B.) Squadron, which took Air Chief Marshal Sir John Salmond to Egypt, landed at St. Nazaire on April 20 on their return journey. One of them was detained there by engine trouble, and it is stated that an engine will have to be changed. The other boat arrived back at Plymouth on April 22.

A Bird hits a "Bulldog"

PILOT OFFICER J. N. BAXTER, of No. 111 (F.) Squadron, was flying over London on April 24 when he believes that a bird flew into the propeller. He was obliged to land in Southwark Park, and through avoiding some men at work there, he stalled his "Bulldog" a few feet up and capsized. An appeal has been issued asking anyone who may find a part of the hub or of a blade of the propeller to take it to the nearest police station.

The Crash near Peshawar

THE bodies of Flying Officer D. H. G. WOOD and Aircraftsman Ring, of No. 20 (Army Co-operation) Squadron, who were killed in a crash on the Khajuri plain, were brought to Fort Jamrud, at the southern end of the Khyber Pass, by Afridi tribesmen. The bodies were given a military funeral at Peshawar. It is stated that some of the Afridis tried to hack their way into the burning wreck of the "Bristol Fighter" to rescue the airmen.

The Iraq Air Squadron

THE five "Moths" of the Iraq Flying Corps, accompanied by a "Puss Moth" flown by Flight-Lieut. Carter, which left England on April 8, arrived safely at Baghdad on April 22, and were given a great reception. King Faisal himself inspected the machines, and was photographed with the pilots.

Stranded in Greenland

GENERAL anxiety has been caused by the plight of Mr. Augustine Courtauld, a member of the British Arctic Air Route Expedition, who had volunteered to remain alone at a camp on the central ice cap of Greenland during the winter. Mr. H. G. Watkins, leader of the expedition, organised two expeditions to find him, but these were unable to locate the camp. Both the "Moths" belonging to the expedition have been put out of action through damage in landings. The ice is now breaking up, which makes a journey on foot very difficult, and also makes the landing of an aeroplane, whether with floats or skis, a very difficult task. Help has been promised by the Swedish airman, Capt. Ahrenberg, who set out from Malmö on April 29. He is using a Junkers F.13 on floats, equipped with wireless, which was obtained from the Swedish Air Transport Company, and is accompanied by a mechanic named Malm and a wireless operator named Ljunglund. The Danish Government is sending a warship to assist Capt. Ahrenberg in wireless direction finding. An Icelandic

pilot named Sigurd Johsson is also setting out in a Junkers machine to join in the search, and he will have the vessel "Odin" as his parent ship.

Autogiro Developments

FOR the first time in history the White House ground became a landing field for an aircraft the other day, when a Pitcairn Cierva Autogiro, piloted by James G. Ray, landed on the presidential lawn. President Hoover greeted the pilot and presented Mr. Pitcairn with the Collier Trophy, which, as previously announced in *FLIGHT*, was awarded to the Pitcairn company for the year's greatest achievement in aviation in America. Praising the developers of the Autogiro, President Hoover said: "The invention of Cierva is one of the most outstanding improvements in heavier-than-air craft. Its ability to rise and descend with safety almost vertically marks a practical and decided step forward." It may be of interest to note in passing that the Buhl Aircraft Co., of Detroit, has announced that they have decided to manufacture aircraft of the Autogiro type, and to market a two-seater model at a moderate price. This company is the third to enter the Autogiro field—the Pitcairn company is now producing large three-seater models on standard production, and plans to introduce a light two-seater model, while the Kellett Aircraft Corp., of Philadelphia, is engaged in pre-production work on a two-seater open machine with side-by-side seating. All three companies will operate under licence from the Autogiro Co., of America, which controls in the U.S.A. the patent rights of the Autogiro.

Dr. Piercy on the Cost of Private Flying

DR. PIERCY delivered the last of his series of Howard lectures before the Royal Society of Arts on Monday, April 27. He said that although private flying in this country had more than doubled itself within the last eighteen months, there was still scarcely one aeroplane to every thousand cars. This extension of flying was to a very large extent impeded by high costs, one of the chief causes of which was the engines, since these were at least twice too large. He said he did not consider it possible that aircraft would make rail and road transit obsolete, as the railways had a century ago made obsolete our widely spread coach system. He said that fundamentally there was nothing to prevent the air becoming a particularly economical medium for travel.

"Redwing" Production

WITH reference to the paragraph in our "Croydon Notes" last week about "Redwing" production, we have received from the Redwing Aircraft Co., Ltd., a communication stating that production of "Redwing" started in earnest some time ago; that at present the machines are being turned out at the rate of one a week, and that very shortly this will be increased to two machines a week. The present organisation of the company includes Mr. Roland R. Darling as superintendent, Flight-Lieut. N. M. S. Russell as sales manager, and Mr. John K. Lane as production manager. Mr. John Kenworthy, designer of the "Redwing," is in the Carshalton Memorial Hospital, recuperating from an operation for appendicitis. His many friends will wish him a speedy recovery.

A.I.D. Annual Dinner

GROUP CAPTAIN H.R.H. THE DUKE OF YORK will be the principal guest at the Sixth Annual Dinner of the Technical Staff Association of the Aeronautical Inspection Directorate, Air Ministry, at the King's Hall, Holborn Restaurant, to-day, May 1. Mr. J. J. Gilmore, Chairman of the Association, will preside. Other guests will include Lord Amulree, Secretary of State for Air; Mr. F. Montague, M.P., Under-Secretary; Mr. C. Llewellyn Bullock, Secretary of the Air Ministry; Air Marshal Sir John Higgins; Air Vice-Marshal H. C. T. Dowding, Air Member of Council for Supply and Research; Group Captain H. M. Cave-Browne-Cave, Director of Technical Development, Air Ministry; Mr. C. R. Fairey, President of the Royal Aeronautical Society; and Squadron Leader A. H. Orlebar, holder of the world's speed record. The Duke of York will propose the toast of the Association, to which Lieut.-Col. H. W. S. Outram, Director of Aeronautical Inspection, will reply. Lord Amulree will also speak.

NOISE

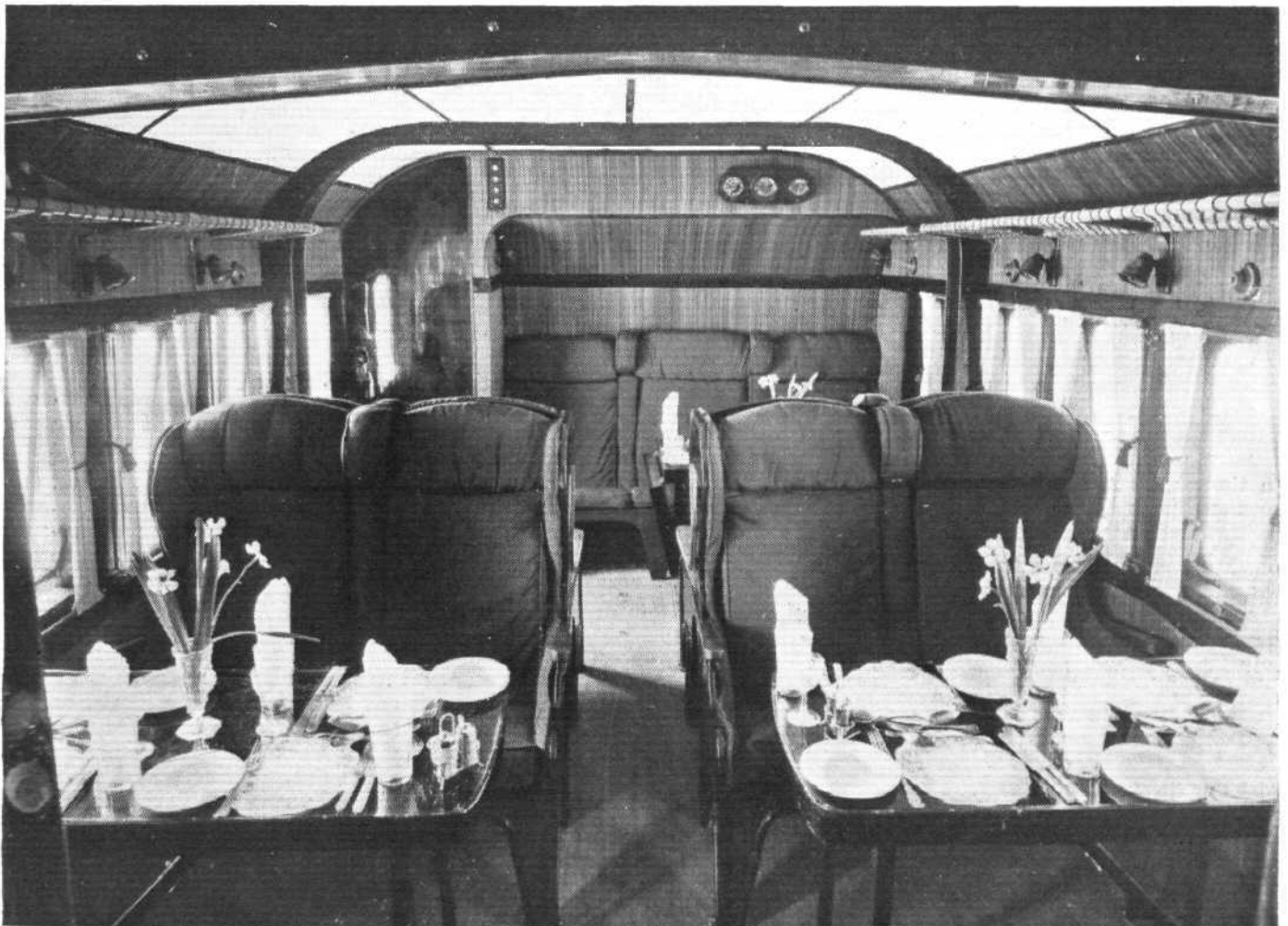
ON Thursday evening, April 16, before the Royal Aeronautical Society, Dr. A. H. Davis, D.Sc., of the Physics Department of the National Physical Laboratory, gave an exceptionally interesting lecture on noise. Noise, and its first cousin, vibration (or ought one to say the elimination of them), should be paramount among the problems being tackled by anyone who is designing commercial aircraft, for there is not the slightest doubt that it is the discomfort and annoyance from these causes in our existing commercial machines which prevent people using aircraft almost as freely as they use any other form of transport. Here, then, was a lecture giving all the latest information and experience gained by the sub-committee specially appointed to investigate this matter, and yet as far as one could see there was not a single representative of any of our large aircraft manufacturing firms present. Practically the whole of the audience were students, medical and scientific people, and with the exception of the Colonel The Master of Sempill, Mr. Gordon England and Mr. M. L. Bramson, we saw nobody who was directly connected with the practical side of aviation. It is not a little surprising that every firm in the country did not at least send one of the senior members of their design staff, and we sincerely trust that this does not mean that they have not realised the importance of the whole subject.

Dr. Davis went to a great deal of trouble, for not only did he read his paper in an admirable and clear manner, but he also had no less than three assistants present, together with a large amount of apparatus, with the help of which he gave us some extraordinarily interesting demonstrations bearing out his contentions and lucidly explaining exactly what noise was, and the methods which

were being investigated to combat it. One of his first experiments was to give his hearers a demonstration showing exactly what was meant by a pure note of varying frequency from the lower limit of audibility through various stages, starting at about a frequency of 64 cycles per second and finishing at about eight thousand. Then later, in explanation of the Decibel system of measuring sound, he demonstrated what the reduction of sound in successive steps of five decibels meant, and he showed that notes of high pitch were still audible when their amplitude had been reduced to a figure where notes of lower pitch but of the same amplitude had become inaudible. As an explanation of his diagram showing the contour of line of equal annoyance of pure tones, he said noisiness was a very difficult term to deal with, as no two people could be in agreement on the subject. He then gave us notes of the same amplitude but of a different pitch, and it was generally agreed that those of the higher pitch, that is, from 1,000 to something over 8,000 cycles per second, were those which caused most annoyance. At the end he demonstrated how complex sounds could be split up and measured by the Crützmaacher method.

Mr. H. E. Wimperis (Director of Scientific Research) was in the Chair and introducing the lecturer, he said that we had to thank Dr. Davis for many things in connection with this subject, and amongst them was his great help in assisting us to understand and use the Decibel system in this country.

The first part of Dr. Davis' paper dealt with the characteristics of sound, and must perforce be omitted here for want of space. Concerning noise in aircraft the lecturer said that the sheer loudness of noises in many



COMFORT IN THE AIR: The cabin of the latest Short "Kents" sets a new high-water mark in comfort. The chairs are large and comfortable, and there is plenty of leg and elbow room, as well as head room. Noise has also been reduced very considerably, so that, altogether, passengers should be able to make the Mediterranean crossing without fatigue.

aircraft was extreme, and questions of whether one type of noise or another was more distressing was rather a refinement. Some people unhesitatingly stated that high notes were more annoying than low notes, while others claimed that prolonged exposure to low notes was especially troublesome. Noise interference with speech in aircraft is one of the drawbacks, and Dr. Davis stated that although the *main energy* of the voice was of low pitch, the characteristics of the voice which was essential to intelligibility were carried by high-frequency sounds. In connection with A.R.C. work on aircraft noise the lecturer had recently made observations in various passenger aircraft. Conversation was naturally easiest when the loudness level was lowest, but he had noticed in one machine in which there was considerable drumming of panels, that this did not seem to interfere with the hearing of speech. The general impression was that the exclusion from the cabin of whistling, hissing and tapping noises, all rich in high-frequency sounds, was very beneficial.

The part of Dr. Davis' paper which dealt with physical measurements of noise analysis must be omitted, and we can but give our readers a brief idea of the noise intensities of a few well-known sounds. The loudness of sounds is measured in a unit known as the Decibel. (Doubtless when some aircraft designer succeeds in producing a really silent aircraft he will call it the "Decibella.") A noisy aeroplane cabin, in the plane of propellers, has a noise loudness of 110 decibels. In the rear of the cabin of the same machine the noise level is reduced to 90 decibels, which, incidentally, is about the same noisiness as that of a pneumatic drill heard in the street at a distance of 20 ft. A quiet aeroplane cabin may equal the noise in a tube train with 80 decibels, as compared with 60 decibels for a saloon car at 35 m.p.h. The corresponding figure for a first-class railway compartment with windows shut is 50 decibels. These figures do give a clear picture of the intolerable noise to which passengers in many air liners are subjected.

The lecturer gave certain figures, in decibels, for engine and airscrew noises, from which we quote the following: A thick-section airscrew at 950 ft./sec., measured at a distance of 80 ft.: 110. The same noise intensity was measured for an unsilenced Napier Lion at 10 ft. The mechanical noise of a Lion was 102, and a Lion silenced exhaust at 10 ft. was 100. The unsilenced exhaust at 80 ft. was 94. A thin-section airscrew at 600 ft./sec. gave 70 decibels at 80 ft.

Static measurements at Farnborough on an airscrew of 8 ft. 9 in. diameter and thickness/chord ratio 0.12 at a distance of 80 ft. gave the following results at various revolutions and tip speeds:

Tip Speed, ft./sec.	Airscrew Speed, r.p.m.	Noise Decibels
550	1,200	72
740	1,600	89
850	1,860	100
960	2,100	110

This airscrew was particularly noisy, and others tested gave a good deal less noise. Some airscrews gave as much noise reduction as 15 decibels per 100 ft./sec. reduction in tip speed. A decrease of 5 decibels per foot reduction in diameter was obtained, and a reduction of ten decibels was achieved by the change to a four-bladed airscrew of the same diameter. "Clearly," the lecturer said, "one of the most obvious steps in minimising airscrew noise is to use large airscrews and avoid high tip speeds."

A comparison of aircraft with ungeared and geared airscrews might be aerodynamically inferior during take-

COMPARISON OF AIRCRAFT WITH UNGEARED AND GEARED ENGINES

	Machine No. 1	Machine No. 2 (geared)
Airscrew tip speed, ft./sec.	830	685
Airscrew diameter, ft.	9½	10½
Pitch, ft.	5.7	8.7
Aeroplane speed, m.p.h.	90-100	90-95
Average noise levels (db. above threshold) in plane of propellers . . .	107	91
Ditto, in rear of cabin	95	85

Dr. Davis stated that the use of multiblade airscrews should be advantageous for reducing noise, but such airscrews might be aerodynamically inferior during take-off.

Engine Clatter and Exhaust Noise

On the subject of the relative noisiness of engine "clatter" and engine exhaust, the lecturer said that the conclusion as to relative noisiness was not fully definite. It might be that exhaust noise masked engine clatter, but it was clear that engine clatter did not mask unsilenced exhaust, because fitting an exhaust silencer resulted in improvement. A number of silencers had been tested by the R.A.E., mainly types which gave back pressures not exceeding 1 lb. per sq. in. In no instance had an improvement of more than 10 decibels been obtained with arrangements practicable on aircraft.

As regards silencing of engine clatter, enclosed water-cooled engines were probably more silent than the unenclosed air-cooled ones, the lecturer said. Whether the clatter of the engine itself could be reduced by other means than by confining it within a housing was a matter for engine designers.

Isolation of Cabins

Having reduced as much as possible at the source noise and vibration, the next step was to enclose it so as to prevent its escape into the air, and also, if possible, the source should be insulated from the structure by substantial layers of materials, such as cork, felt or rubber, with a view to preventing the access of vibration to the structure. The remaining step was to keep the sources of noise as remote as possible from all regions from which it was specially desired to exclude noise, and to fit these regions with special protection.

Dealing with the transmission of sound by partitions, Dr. Davis said:—

Summarising, therefore, the general conclusions to which one is led in connection with sound transmission by partitions, it appears that for single partitions weight is the primary factor. There is evidence that the panels transmit sound in virtue of the fact that they are set in vibration like diaphragms. (N.B.—An oscillatory motion of the air in a sound wave of 1,000 cycles per second is audible when the motion is as small as a hundred millionths of a centimetre.) High insulation can be achieved by two *completely isolated* panels. Where isolation is incomplete (as when both panels are attached to the same structure) the insulation is greatly reduced, owing to the transmission of vibration from the front panel via the structure to the back one. Insulation between the structure and the panels should be useful. A filler may or may not be advantageous in a double-walled structure—it acts as a tie on the one hand, and as a damper of vibration and absorber of inter-space sound on the other.

Test results indicated that good insulation against noise could be obtained with cabin walls having a weight in the region of ¼ to 1 lb./sq. ft., but that beyond this point the increase in insulation for additional weight was small.

The following approximate weights of materials were given by Dr. Davis:—

	lb./sq. ft.
Doped fabric	0.06
Rexine	0.14
Single sheet balsa wood, ¼ in.	0.20
Sheet micarta, ⅜ in.	0.23
A1 sheet, 0.025 in.	0.35
Celastoid (for windows)	0.5
Plywood, ½ in.	0.52
Balsa wood, ½ in.	0.30
Triplex windows	1.9
Plate glass, ¼ in.	3.6

Dr. Davis pointed out that fairly substantial windows were essential, kept as small as possible, while doors and emergency exits should be moderately well fitting. As a rough figure, he said that the combined area of gaps, cracks etc., should not exceed something of the order of 1:10,000 of the total area of the enclosing surface of the cabin.

Summary and Future Development

In concluding his paper, Dr. Davis gave the following summary:—

Summarising briefly, attention has been given to various aspects of the problem of reducing noise in and from aeroplanes. At present noise levels in commercial machines range from 75-80 decibels in the quietest tested, to 110 decibels in a cabin in the plane of airscrews of a noisy one. As a result of a study of the sources of noise—airscrew, engine exhaust and engine clatter—it appears that airscrews, when of high speed, are the dominant cause of noise. Conditions favourable for reduction of airscrew

noise are reduced speed, larger diameter, thin section, etc. The clatter and noise of an engine appear to be of the same order of magnitude, say 100 db: above threshold, as an airscrew of moderate speed. Experiments suggest that airscrew noise can be reduced to, say, 80 decibels, and accordingly engine and exhaust noise demand attention. Probably something can be done by interposing wings as a screen between, say, the exhaust and the cabin, or by enclosing the engine. Some degree of exhaust silencing, say 10 db., can be achieved by a simple perforated pipe. Further silencing may involve increased back pressure. The silencing of engines appears desirable, either by enclosing them, or, if possible, by re-designing camshafts, etc., to modify the motion of moving parts.

Laboratory experiments upon the exclusion of noise by the provision of insulating walls, appear to indicate that a reduction on an average of the order of 30 decibels may be attained, provided filled double walls of some $\frac{3}{4}$ lb. to 1 lb. weight per sq. ft. are employed. Some reserve is possibly necessary in applying this result to an actual aeroplane. Assuming it applies, however, such a cabin would reduce the noise (100 db.) of the power plant outside the cabin to 70 decibels inside. A further reduction could perhaps be attained in a design which located the power plant well forward or screened it from the cabin. Consequently the reduction of cabin noise to practically that (60 db.) in a railway train is within the bounds of early developments.

It seems very probable at the moment of writing that airscrew noise can be appreciably reduced. The time is arriving when we shall look to constructors to employ quieter or cowled engines, with more adequately silenced exhausts.

THE DISCUSSION

In opening the discussion Mr. R. S. Capon, of the Royal Aircraft Establishment at Farnborough, said that, as a general rule in aircraft, we were particularly concerned with the quality as well as the quantity of noise, in fact the former might in many cases prove to be the more important, and he quoted the old controversy as to what noises can be considered annoying. Dr. Davis, he said, had often suggested that a description of an annoying noise was the shelling of peanuts during the playing of an overture, but he (Mr. Capon) said he felt that many people might justifiably say the playing of an overture during such time as they were shelling peanuts was annoying. Continuing, he said he was rather amazed at the consistency of the measurements obtained by Dr. Davis with the Barkhausen instrument, and he himself found that whereas they usually got consistent results from the noise from airscrews, yet they did not do so with those from engines, and he thought this might be due to engine noise being composed of several frequencies. Dr. Davis, he said, was to be thanked for helping to introduce the Decibel system, but he thought that a decibel had to be treated with very great care since the quantity of noise was very difficult to define and its measurement subject to many errors. Mr. Capon explained how the smallest errors sometimes gave them the greatest trouble, and when measuring noise and using a sound-proof screen great trouble had been found through having the smallest cracks around it, and he pointed out that a crack having a free area of one thousandth of the whole area of the screen let through as much sound as the rest of the screen. He gave us a little information about the experiments which have been carried out at Farnborough with various kinds of silencers, and he said that as a general rule whatever design of silencer was brought along they invariably found it to give a reduction of only 10 decibels, but recently they had discovered that the noise came, not so much out of the silencer as through the silencer, and they had now evolved a method of covering the silencer in asbestos, with the result that they were able to get a reduction of 30 decibels, and this he hoped would pave the way to designing a practical silencer for general use.

Dr. Tucker, in charge of similar work at the Air Defence Experimental Station, Biggin Hill, said they were greatly indebted to Dr. Davis for making the Decibel system familiar. He said that in measuring a

sound, he had found that they had obtained consistent results when the noise was sustained and steady, but inconsistent results when the noise was intermittent. He said that the Decibel system offered many difficulties, not the least of which was the fact that decibels did appear to like being added to each other, that is, when a complex noise was analysed into frequencies of different amplitudes the addition of these numbers will come to a great deal more than the ordinary measurement of the total noise; therefore, while it was true that with pure notes one might be able to add two notes to, say, five decibels and obtain one of ten decibels, yet this was not the case with musical sounds or with sounds of different frequencies. He said that Dr. Davis had said very little about his tuning-fork method of measurement, but that it had been found to be very valuable indeed, and at Biggin Hill they were very grateful to him for giving them this method. He had, he said, made certain measurements in the cabins of aircraft, and he considered that a cabin having walls composed of doped fabric, such as in the Argosy, was palpably absurd, and that a mere sheet of three-ply produced a reduction of seventeen decibels over the doped fabric.

Mr. H. Glauert then gave the assembly a few details about the theory he is formulating, as to the noise coming from airscrews, and he said that the noise of an airscrew was exactly comparable to that produced by a cylindrical rod of the same size rotating at the same speed. Experiments had been carried out on the whirling tower, and he had found that the oft-reiterated theory that the noises produced by an airscrew meant a great loss of power, was a fallacy, since in actual measurement it represented but one-thousandth of the actual power output of the airscrew. He said a good deal of the noise would probably be found to be due to the pressure system in the air which followed each blade and produced noise which was particularly noticeable in the plane of rotation. There was no doubt, he said, that the predominant noise of an airscrew depended upon its tip speed, and this could be overcome by reduction gearing, by the use of thin sections and also by having four-bladed airscrews.

Mr. D. R. Pye (Deputy Director of Scientific Research) said that the Decibel system appeared to him to offer many difficulties, and that it looked as if it would break down at very low frequencies. He also suggested that it would be profitable to analyse the exhaust noises and to find out exactly what it was that caused the noise, and he thought that this might be found to be due to the fact that the exhaust gases were very hot. [We ourselves have seen a silencer which did its work exceptionally well which incorporated a system whereby the exhaust gases were completely cooled before expansion.—ED.]

Mr. C. G. Grey said that the demonstration given by Dr. Davis and also his figures, showed that nobody knew anything about sound, and he said he would like to know exactly what it was that caused the noise when one withdrew a cork from a bottle. His pet theory, he said, was that the noise in the cabin of an aircraft was largely due to the battering of the slipstream against the sides of the cabin.

Mr. M. L. Bramson said that he had had some experience in sky writing, and there it had been necessary for the purposes of sky writing to join the two exhaust pipes from the engine and to lead them right aft to the tail of the machine and also to lag them with asbestos. The result had been to produce quite the quietest aircraft he had ever flown.

Dr. Davis, in reply, thanked everyone for the kind words they had said about his lecture, and mentioned Steinber's formula for the measurement of complex noises, but he said it was extremely complicated and did not seem very consistent in its results. He certainly agreed, he said, that we ought to find out what it was that caused exhaust noises, and he was interested, he said, in Mr. Grey's theory that the noise was caused by the battering of the slipstream against the cabin sides. He then said that he would deal with the replies at greater length in writing.



CORRESPONDENCE

"I WILL OBEY."

[2740] With reference to the article of "Daedalus" and letter from "Per ardua ad infinitum." The whole trouble appears that no official body solely connected with aviation is looking after the interests of the amateur pilot, but are regarding him as an evil nuisance which cause them a large amount of extra work. The stated objects of the Royal Aero Club are "to do all such acts and things as may be conducive to the encouragement and development of aeronautics and to form a club for the association of persons interested in aeronautics." Surely the interests of amateur pilots and private owners are included in the first aim. If so, the Royal Aero Club as the representative of the British Aviation should show more co-operation and personal touch with amateur pilots, it should find out and rectify their small difficulties and look after their interests and safety. However, it appears difficult to see how the two objects of the Royal Aero Club mentioned above can be run together. If you are a centre of information and advice on matters pertaining to aeronautics and a representative body of aviation, surely everyone should be invited to support it without social distinction, but if you are a club, you must have social distinction. The only answer appears to be that the Royal Aero Club should form a branch or association for amateur pilots with a full-time staff to look after their requirements, the Association being amongst other things a centre of information and advice, where any person, male or female, can consult or visit (on the lines of the A.A.), on paying a small annual subscription, and in no way to be connected with the social side of the Royal Aero Club. Undoubtedly, through the Associated clubs' General Council, much is being done, but it is personal and individual co-operation which is at present required between the Royal Aero Club and all private owners and amateur pilots. The Royal Aero Club should employ someone to be continually visiting aerodromes and private owners to find out their difficulties and matters of interest and to take action in cases of dangerous flying, otherwise, in time, the Air Ministry will take action which will mean more laws and regulations. Special committees are excellent, but most pilots have not the time to devote to them they would like. Let us hope before long there will arise a live, solely aeronautical, organisation respected and supported by all interested in private aviation. There is room for such an organisation, whose aims would in no way interfere to a serious extent with the excellent aeronautical work being done by the Aviation branch of the A.A. I believe it would receive (if the organisation proved to be live) enough members to support itself.

London, S.W.

April 20, 1931.

OUR AIRSHIP POLICY

[2741] The trouble with many of the airship enthusiasts is that they will persist in regarding airships as pawns in some political game. Airships are to "improve Imperial communications," "patrol trade routes," and, as suggested by last week's correspondent, in an excess of military zeal, "carry troops in time of war . . . carry aeroplanes . . . act as a base for them in land or naval operations . . . wagons of the air . . . aerial defence."

What these people do not seem to realise is that airship work has never emerged from the experimental stage in this country. Our own policy has been to blow hot and cold, programmes being started with enthusiasm and then suddenly dropped for "reasons of public policy."

When R 100 and R 101 were designed and constructed, it really appeared as though airships were going to get a chance. The tragedy of R 101 lies in this fact, that it was designed by some of the finest brains and constructed by some of the best engineers in the world, and yet was sent to destruction through these miserable "reasons of public policy." Every engineer knows that a new design is seldom free from "teething troubles," which, although comparatively trifling, may spoil the machine if they are not overcome, and, moreover, that some of these difficulties only reveal themselves after extensive trials.

The different attitude of the Germans to their airships may be realised from the following extracts from Dr. Eckener's lecture to the R.Ae.S., after his flight to America in the Z.R.3.

" . . . we had to anticipate whirls and thunderstorms in the Gulf Stream region. It was seen to, therefore, that the airship had absolutely faultless gas-tight gas cells. Furthermore, we made sure, by daily trials of the valves during the last three weeks prior to our departure, that

these valves, after being pulled, closed up tight with absolute sureness and safety." " . . . we were obliged, in the interest of propaganda for airships, to 'put over' our flight in good style. . . ."

It is almost unnecessary to add that Dr. Eckener has always "put over" his performances in the very best style. It is not altogether pleasant to read that the "Graf Zeppelin" has recently accomplished with ease the flight to Egypt which R 101 might have made with even better performance if those last few months had been spent in making her technically sound.

In view of the present financial stringency, probably the best policy would be a small but continuous programme involving test flights by R 100, model experiments and research on more suitable materials for covering and gas cells. Financial conditions permitting, R 101 could probably be duplicated at a much smaller cost, if the jigs and tools are still existing, than the original construction. However, all this is too much to hope for.

Until there has been produced in this country an airship which is reasonably safe, reliable and with an adequate performance, the technical experts should be allowed to get on with the job, and all imperialists, militarists and pessimists who show any tendency to interfere should be quietly but firmly frustrated.

Dr. Eckener, at the end of the lecture mentioned above, echoed the sentiments of Count Zeppelin when he said: " . . . airship traffic is a matter of international collaboration, and I take pleasure in expressing the hope, therefore, that the airship may become a means of bringing the nations of the world together in harmonious co-operation."

C. E. T. MAGUIRE.

Peckham, S.E.

April 17, 1931.

THE GUILD OF AIR PILOTS' LETTER

[2742] I gather from your "Comments" in FLIGHT for April 24 that certain professional pilots desire an increase in the laws, orders, regulations, forms, restrictions, etc., with the consequent increase of parasites to deal with them, that already indicate the feeble health of poor old England. Immaturity's panacea for all the ills to which the body politic or economic is liable is frequent doses of such medicine. Health and strength do not need medicines.

Consider the motor industry. Any vehicle could be stuck on the roads, any individual could get a licence. Now that the motor has reached prosperity, it can carry Road Traffic Acts and the parasites consequent thereto. But it has had thirty years of freedom. Turn to the mercantile marine—the old sea-dogs, Hawkins, Drake and the like, did not have to possess Master's Tickets or Certificates of Seaworthiness. When the English mercantile marine had grown into a giant, it could carry many Acts and innumerable parasites. But it had two centuries of freedom behind it, and the Government Department that it eventually had to carry was not the Admiralty, a fighting machine, but the Board of Trade, a commercial one.

To grow vigorously, to enjoy health and strength, youth, whether animal, industrial or commercial, needs freedom. Civil aviation, step-mothered, not "grand-mothered," by military bureaucrats, has already little enough.

North Walsham.

A. J. RICHARDSON.

April 24, 1931.

THE FOKKER F.32

[2743] On page 363 of your last issue of April 24 you preface the description of the Fokker F.32—the publication of which we appreciate very much—by saying that this type "will probably be used on the Dutch East India service." Read in connection with the next sentence, this may give the impression that you had received the information regarding the probable use of this aeroplane on the Indian service from us.

As this is not the case, and as, indeed, the said probability is highly remote, if even it may be said to exist, we should appreciate if you could publish our present letter in your next issue.

B. STEPAN.

(N.V. Nederlandsche Vliegtuigenfabriek.)

Amsterdam.

April 25, 1931.

[The statement referred to was based on information obtained by our contributor, Mr. M. Langley, for his articles on the K.L.M. Services to Batavia, which appeared in our issue for January 9 last.—Ed.]

THE ROYAL AIR FORCE

London Gazette, April 21, 1931

General Duties Branch

Lt. C. R. V. Pugh, R.N., is reattached to R.A.F. as Flying Officer with effect from April 14 and with seny. Aug. 10, 1925. The follg. Pilot Officers on probation are confirmed in rank (March 27):—E. V. N. Bramley, R. A. Byrne, R. J. R. H. Makgill, W. B. Thompson. Flying Officer R. S. Darbishire is placed on half-pay list, scale A (April 10); Squadron Leader C. L. Scott, D.S.C., ceases to be seconded for duty with British Advisory Staff in Chile (April 4). The follg. Flight Lieutenants are placed on retired list at their own request (April 22):—H. J. Brown, L. M. Hilton, D.F.C., A.F.C.

Flying Officer J. Evason is placed on retired list (April 17); Flying Officer V. B. Myers is transferred to the Reserve, Class C, (April 22); Flying Officer C. B. Field resigns his short service commn. (April 2).

Stores Branch

The follg. Warrant Officers, Class I, are granted permanent commns. as Flying Officers on probation with effect from and with seny. of April 13:—4721 J. E. Atkins, 709 W. H. Dyson, 777 C. W. Goodchild, M.B.E., 836 R. E. P. Paynter, D.C.M., 51092 R. J. Williams.

Accountant Branch

Flight Lt. W. A. Wadley is placed on retired list (April 22).

Dental Branch

Flying Officer A. P. Atkins, L.D.S., is granted a non-permanent commn. as Flight Lieutenant (March 25); Flight Lt. W. Wormington, L.D.S., Capt. Army Dental Corps, relinquishes his temp. commn. on return to Army duty (April 7).

Chaplains Branch

The Rev. N. F. Porter, L.Th., B.A., is granted a short service commn. as Chaplain (Church of England) with relative rank of Squadron Leader (April 14).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commanders: C. W. H. Pulford, O.B.E., A.F.C., Station H.Q., Bircham Newton, to command, 11.4.31. R. Leckie, D.S.O., D.S.C., D.F.C., to No. 210 Sqn., Felixstowe, to command, 11.4.31. A. S. Morris, O.B.E., to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 11.4.31. E. J. P. Burling, D.S.C., D.F.C., A.F.C., to No. 209 Sqn., Mount Batten, to command, 16.4.31.

Squadron-Leaders: C. L. Scott, D.S.C., to R.A.F. Depot, Uxbridge, 4.4.31. E. J. D. Routh, to No. 9 Sqn., Boscombe Down, 14.4.31.

Flight-Lieutenants: E. M. Drummond, to R.A.F. Depot, Uxbridge, 7.3.31. B. B. Caswell, to R.A.F. Depot, Uxbridge, 7.3.31. J. L. Wingate, to No. 29 Sqn., North Weald, 7.4.31. R. H. Barlow, to No. 7 Sqn., Worthy Down, 14.4.31.

Flying Officers: J. A. S. Outhwaite, to R.A.F. Depot, Uxbridge, 7.3.31. K. E. Parker, to R.A.F. Depot, Uxbridge, 28.3.31. H. C. Friday, to R.A.F. Depot, Uxbridge, 7.3.31. A. T. C. Hazledine, to No. 10 Sqn., Boscombe Down, 15.4.31. N. F. V. Henkel, to Armament and Gunnery School, Eastchurch, 11.4.31. W. K. Beisiegel, to H.M.S. *Courageous*, 17.4.31.

Pilot Officers: W. F. Hilchie, to No. 210 Sqn., Felixstowe, 12.4.31. R. K. Brougham, G. H. Davies, G. H. Denholm, J. A. Dixon, D. L. Dustin, W. N. Elwy-Jones, A. W. M. Finny, M. H. Formby, H. R. Graham, P. H. Hamley, R. H. Hobbs, S. Keane, J. H. Lingard, J. Meares, J. D. Miller, S. M. Moseley, D. H. Oxley, D. Scorgie, S. E. R. Shepard, F. W. C. Shute, L. C. Slee, A. H. J. de P. Smith, E. A. Springall and J. F. Stephens, to R.A.F. Depot, Uxbridge, on appointment to short service commns., with effect from 10.4.31.

The following are posted to the units indicated, with effect from 7.4.31:—G. A. Bolland, to No. 1 Sqn., Tangmere; G. V. Barber, R. J. W. Barnett, G. F. K. Donaldson, all to No. 2 Sqn., Manston; R. B. Harrison, G. Nelson, H. C. O'Loughlin, L. J. M. White, all to No. 4 Sqn., S. Farnborough; R. G. E. Catt, to No. 7 Sqn., Worthy Down; P. Haynes, G. M. Williams,

Memorandum

The permission granted to Sec. Lt. J. Groves to retain his rank is withdrawn on his conviction by the Civil Power (Jan. 15).

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The follg. are granted commns. in Class AA (ii) as Pilot Officers on probation:—J. A. Slater (April 7); J. B. W. Sherlock (April 9).

Flying Officer J. C. Jeffrey, M.C., ceases to be employed with the Regular Air Force (April 16); Flying Officer R. T. Halliwell is transferred from Class C to Class A (Jan. 1). The follg. Flying Officers are transferred from Class A to Class C: W. M. Shoosmith (July 29, 1930); L. H. Mason (March 8).

The follg. relinquish their commns. on completion of service:—Flying Officer D. S. Purnell (Oct. 26, 1930); Flight Lt. H. C. Black (Oct. 28, 1930); Flying Officer P. Christopherson (Dec. 20, 1930); Flying Officer W. A. Chase (March 7); Flying Officer T. W. G. Cattell (March 15); Flying Officer L. H. Cooper (March 15); Flight Lt. S. H. Gaskell (April 20). Flight Lt. S. Frost relinquishes his commission on completion of service and is permitted to retain his rank (Feb. 15).

AUXILIARY AIR FORCE

General Duties Branch

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON. The follg. to be Pilot Officers:—G. A. Reid (March 17); I. D. Shields (March 23). Pilot Officer J. H. Flynn resigns his commn. (March 23, 1929).

No. 604 (COUNTY OF MIDDLESEX) (BOMBER) SQUADRON.—H. C. Hebard to be Pilot Officer (March 16).

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—Pilot Officer J. M. Abell is promoted to the rank of Flying Officer (Nov. 14, 1930).

No. 608 (NORTH RIDING) (BOMBER) SQUADRON.—K. Pymon to be Pilot Officer (March 27).

Stores Branch

Squadron-Leader F. G. M. Williams, to No. 23 Group H.Q., Grantham, 2.4.31.

Flight-Lieutenants: T. S. James, to R.A.F. Depot, Uxbridge, 7.3.31. J. V. Mason, to No. 4 Stores Depot, Ruislip, 8.4.31. L. N. Sargent, to H.Q., Coastal Area, 2.3.31.

Flying Officers: H. Seidenberg, to R.A.F. Depot, Uxbridge, 21.3.31. The following are all posted to Home Aircraft Depot, Henlow, on appointment to permanent commns. on probation, with effect from 13.4.31:—J. E. Atkins, W. H. Dyson, C. W. Goodchild, M.B.E., R. E. P. Paynter, D.C.M., and R. J. Williams.

Accountant Branch

Wing Commanders: H. G. Jones, to H.Q., Coastal Area, for duty as Command Accountant, 20.3.31. A. G. N. Belfield, to H.Q., Air Defence of Gt. Britain, Uxbridge, for duty as Command Accountant, 10.4.31.

Flight-Lieutenants: J. Freeman-Fowler, to School of Balloon Training, Rolleston Camp, 1.4.31. D. F. A. Clarke, to H.Q., Coastal Area, 8.4.31. A. E. Vautier, to Air Ministry (D. of E.), 20.4.31.

Medical Branch

Wing Commander A. E. Panter, to R.A.F. Depot, Uxbridge, 21.3.31.

Flight-Lieutenants: J. D. Leahy, M.C., to No. 28 Sqn., Ambala, India, 9.3.31. G. S. Strachan, to No. 1 (Indian Wing) Station, Kohat, 13.3.31. J. Magner, to R.A.F. Depot, Uxbridge, 19.3.31. E. A. Rice, to R.A.F. Depot, Uxbridge, 21.3.31.

Flying Officer W. J. Cumming, to R.A.F. Depot, Uxbridge, 7.3.31.

IN PARLIAMENT

Airship Development.

MR. MONTAGUE, on April 15, in reply to Mr. D. G. Somerville said the total expenditure on airship development from 1920 up to March 31, 1931, was approximately £2,410,000, all but a small portion being expenditure on the airship programme commenced in 1924. Provision for a net expenditure of £50,000 has been made in the current estimates. A decision to close Cardington down would not result in an immediate cessation of all expenditure, and the probability is that after making the necessary terminal payments there would not be a very material saving out of the year's provision.

Roof-Landing Experiments.

SIR N. GRATTAN-DOYLE asked what local authorities and city or town councils have given permission for experiments to be carried out in their areas with regard to ascents and landings by means of helicopter or autogyro flying machines on or from roofs of buildings; and what special safety measures have been insisted upon.

MR. MONTAGUE: No such permission has, so far as I am aware, been granted, but the question of safety restrictions will certainly be considered if and when an application for carrying out roof landing experiments is received.

Royal Navy Flying Tests.

MR. ALEXANDER in reply to Sir N. Grattan-Doyle said no tests with flying machines capable of vertical ascent and descent from or on the decks of naval vessels have been carried out on board His Majesty's ships.

Australian Air-Mail Service

LIEUT.-COMMANDER KENWORTHY, on April 22, asked the Under-Secretary of State for Air why flying boats were not used on the experimental air-mail service to Australia for that part of the route that was over the sea between Singapore and Northern Australia; and whether it is intended to use flying boats in the future?

MR. MONTAGUE: Landplanes are being used because the route through the Dutch East Indies is organised for landplanes only. I may say that the

Dutch Company also operate over that route with landplanes. As regards the future, the establishment of a regular service is itself still in the discussion stage, but the use of flying boats would necessitate reorganising the route, at additional expense, instead of taking advantage of the organisation which already exists. When it comes to a question of a regular service, the matter will be reconsidered.

Royal Air Force Reserve of Officers

MR. MONTAGUE, in reply to Sir W. Brass, said the average cost of the annual training of a flying officer of the Reserve of Air Force Officers, including pay, allowances and travelling expenses, may be stated as approximately £350.

Indian Army Air Arm

MAJOR POLE, on April 27, asked the Secretary of State for India the present position in regard to the proposed addition of an air arm to the Indian Army?

MR. BENN: I am now working out the details of the scheme in consultation with the Secretary of State for Air and the Government of India, and I hope it will not be long before the new Indian Air Force is definitely instituted. I should mention that it will be distinct from the Indian Army.

Civil Aviation

MR. DAY asked the Secretary of State for India the amount of financial assistance given by the Government in India for the purpose of developing civil aviation in India for the 12 months ended to the last convenient date; and has he any particulars of the amount contributed towards the maintenance of light aeroplane clubs during the same period?

MR. BENN: The total estimated expenditure of the Government of India on civil aviation and connected items during the financial year 1930-31 amounted to Rs. 47,40,950 (approximately £355,570). This included a sum of Rs. 2,59,700 (approximately £19,477) in respect of financial assistance to six light aeroplane clubs and to the Aero Club of India and Burma, Limited.

AIR POST STAMPS

By DOUGLAS ARMSTRONG

THE opening-up of the two longest air mail routes within the Empire brings us no nearer that "consummation most devoutly to be wished," a British air post stamp. Souvenir envelopes and private cachets provided by the publicity department of the Imperial Airways alone characterise letters carried on the inaugural flights of the London-Tanganyika and London-Australia services. Meanwhile the new Postmaster-General maintains the *non-possumus* attitude adopted by his immediate predecessor in the face of all representations on the subject.

Kingsford Smith Stamps

Australia has just paid a novel and well-deserved tribute to the aerial exploits of Air Commodore Kingsford Smith by dedicating to him, most distinguished airman, a special set of three postage stamps adorned with a handsomely-engraved vignette showing his famous aeroplane, the "Southern Cross," surmounting the two hemispheres. At the foot, beneath sprays of laurel, is a tablet containing the inscription "Kingsford Smith's World Flights," and across the top the single word "Australia" against a background formed by the winged insignia of the Australian Air Force. Two of the trio, viz., 2d. carmine and 3d. blue, are available for ordinary postal purposes, but the third, 6d. purple, is reserved for the air mail service. So great was the public demand for these commemorative stamps that the entire issue is said to have been sold out within a few days of their appearance on March 19 last.

This is actually the second occasion on which the Commonwealth Government has created a special stamp in honour of an aviator, the first being when the late Sir Ross Smith reached Melbourne at the conclusion of his epoch-making England-Australia flight on February 26, 1920. Only the other day a letter bearing the Ross Smith souvenir stamp was sold for £40 in a London auction room.

Latest "Zeppelin" Issues

The voyages of the giant airship "Graf Zeppelin" have already been responsible for some notable additions to the air post collectors' album. Recent flights to Hungary and Egypt have proved no exception to the rule. In the former instance limited printings totalling 30,000 copies of each denomination were made from the plates of the existing 1 and 2 pengos air mail stamps, but in distinctive colours, the 1 pengo in orange and the 2 pengo in purple, with the further distinction of an overprint reading "Zeppelin, 1931," in decorative type. Souvenir cachets were likewise applied to letters sent by Zeppelin mail, a winged device in green being employed for the Budapest-Debreczin flight and a large concentric circle in blue for those consigned by the return trip to Friedrichshafen.

Special stamps were provided likewise by the Egyptian postal authorities when the dirigible visited that country last month, in the form of surcharges of 50 milliemmes (for postcards) and 100 milliemmes (for letters) upon the contemporary 27 milliemmes air mail stamp, together with the inscription "Graf Zeppelin, Avril, 1931," in French and Arabic characters, green for the 50 milliemmes and purple for the 100 milliemmes. Twenty-five thousand copies of each denomination were thus overprinted, and a considerable proportion used on the limited mail despatched by the Zeppelin on April 10 to Europe and elsewhere.

Java-Australia Air Mail

Both an adhesive stamp and a souvenir cachet are to be applied to correspondence carried on the first air mail flight from Java to Australia, which is scheduled to take place at the beginning of May. The stamp, of the face value 1 gulden, is printed in blue and brown, with a picture of a pilot at the control of his machine passing over a portion of the terrestrial globe, whereon the route of the flight is outlined. It is the work of the aviator, Captain Pattiste, of the Royal Dutch Artillery, who will himself undertake the flight, and will cease to be sold after the departure of his aeroplane from the last point of call in the Dutch Indies.

New air post stamps of a more definitive character are also due to be issued here in the near future in a fantastic design by the native artist, Mas Perngadi, rotary printed, and comprising 30 cents purple, 4.50 gulden Prussian blue, and 7.50 gulden dark green.

Answer to Correspondent

"A. J. C. O." (Walthamstow). The value of letters carried over the London-Paris air mail line in 1919-20

depends upon the colour in which the cachet "Air Mail Express" is applied. The black variety is the scarcest, and worth to-day, perhaps, a couple of pounds. Covers showing red or purple impressions are much commoner, and would probably realise under a pound from an interested collector.

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: No. 1342 (Ac. 474—T. 2985). Airscrews for High-Speed Aeroplanes. By H. Glauert. June, 1930. Price 1s. net. No. 1348 (Ac. 480—T. 2994). *On the Validity of Large-Scale Tests in an Open-Jet Wind Tunnel.* By W. G. A. Perring and C. Callen. July, 1930. Price 9d. net. No. 1349. *On Rendering Airflow Visible by Means of Hot Wires.* By H. C. H. Townend. October, 1930. Price 9d. net. H.M. Stationery Office, Kingsway, London, W.C.2.

Cinquieme Congres International de la Navigation Aerienne, La Haye, 1-6, September, 1930. Vols. 1 and 2. Martinus Nijhoff, Lange Voorhout 9, The Hague, Holland. Price Fl. 32.

Report on the Royal Air Force Promotion Examinations "B" and "C," held on 2nd, 3rd, 4th and 5th September, 1930. London: H.M. Stationery Office, Kingsway, W.C.2. Price 1s. net.

The Bulletin. March 16th, 1931. Vol. 2. No. 9. Western Canada Airways, Winnipeg, Canada.

Aeronautical Research Committee Reports and Memoranda: No. 1346. (Ac. 478-r. 2992.) The Application of the Method of Operators to the Calculation of the Disturbed Motion of an Aeroplane. By L. W. Bryant and D. H. Williams. July, 1930. H.M. Stationery Office, Kingsway, London, W.C.2. Price 9d. net.

NEW COMPANIES REGISTERED

LONDON GLIDING CLUB PROPRIETARY, LTD., Empire House, St. Martin's le Grand, E.C.1.—Capital £100 in £1 shares. Objects: to promote, assist and encourage gliding, soaring and aerial navigation in all its forms, and the study of aeronautics, etc. Directors: J. R. Ashwell-Cooke, Uplands, Mayfield, Sussex; D. G. O. Hiscox, 60, Vauxhall Bridge Road, S.W. 1 (director of Park Langley Sports Club, Ltd.); M. D. Manton, 19, Ebbsfleet Road, N.W. 2. The committee of the London Gliding Club may appoint and remove any director.

ROCK CARLING, LTD., 237-8, Berwick Avenue, Trading Estate, Slough.—Capital £1,000 in £1 shares. Manufacturers of and dealers in sail planes, gliders, and heavier-than-air flying machines of all kinds, motor-cars, etc. Directors: F. R. Carling (engineer), Mrs. Alison J. Carling, both of 2, Manor Drive, Mill Hill, N.W. 7.

AERONAUTICAL PATENT SPECIFICATIONS

(Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

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9,058. G. L. R. J. MESSIER. Brakes for the wheels of aeroplanes. (346,139.)
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25,607. U. ANTONI. Construction of flexible aeroplane wings having a variable profile. (346,251.)

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